Service Manual

HP LaserJet 2100

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Publication number
C4170-90959

First edition, February 1999

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WARNING

Electrical Shock Hazard

To avoid electrical shock, use only supplied power cords and connect only to properly grounded wall outlets.

Hewlett-Packard Company
11311 Chinden Boulevard
Boise, Idaho 83714 U.S.A.

Conventions

This manual uses the following conventions:

The names of major printer parts and assemblies are Capitalized.

Color is used to emphasize items which are important to the material under discussion.

Bold is used for emphasis, particularly in situations where *italic* type would be confusing.

Italic type is used to indicate related documents or emphasis.

NOTE: Notes contain important information set off from the text.

CAUTION: Caution messages alert you to the possibility of damage to equipment or loss of data.

WARNING! Warning messages alert you to the possibility of personal injury.

Chapter Descriptions

Chapter 1: Product Information

This chapter describes features of the printer, including locations of external and internal assemblies, and gives safety and regulatory information. Use this chapter to form a basic service approach, and to get technical assistance.

Chapter 2: Operating Requirements

Chapter 2 details site requirements, including space and environmental specifics. The chapter also defines specifications for paper and other media with this printer.

Chapter 3: Printer Configuration

Learn to use the control panel, perform an engine test, and reset the printer. Chapter 3 contains options for configuring the printer through service mode, and also details about installing and using the Remote Control Panel. Network and IR printing is also explained.

Chapter 4: Printer Maintenance

This chapter discusses service check points, procedures for cleaning the printer, and how to use toner cartridges effectively.

Chapter 5: Functional Overview

The functional overview discusses each of the printer's stages to form and develop an image. This chapter details the engine control system, the formatter system, the paper feed system, and the sequence of printer operation.

Chapter 6: Troubleshooting

Use the systematic troubleshooting process to solve printing problems. This process contains a preliminary troubleshooting flowchart, with explanations of each step throughout the chapter. Explanations include a table with descriptions and recommended actions for all control panel messages, image defect samples, troubleshooting problems with media, and diagrams showing the locations of components that may be causing problems.

Chapter 7: Removal and Replacement

Step-by-step procedures show how to replace field replaceable units (FRUs) in the printer.

Chapter 8: Parts and Diagrams

Exploded view drawings and part number listings are included for all replaceable parts in the printer. The composite table of replaceable parts is sorted alphabetically by part name, and also sorted numerically by part number. Both tables are cross-referenced to the diagrams in the chapter.

Index

The index is an alphabetical, cross-referenced listing of information found in the main body of the manual.

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1 Product Information

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Printer Description and Features

Table 1-1. Printer Description and Features

Print Speed	● 10 pages-per-minute printing (with Intel 80960JD 66 MHz RISC-based formatter and 33 MHz BUS).
Print Quality	● True 1200 x 1200 dots per inch (dpi) text and graphics. ● Resolution Enhancement technology (REt) (600 dpi only). ● Adjustable settings to optimize print quality and performance: Best Quality: 1200 x 1200 dpi Faster Performance: 600 x 600 dpi Custom: User Defined Settings ● HP UltraPrecise toner cartridge. Cartridge capacity equals approximately 5000 pages at 5% toner cover.
Paper Handling	● Adjustable Tray 1 for letterhead, envelopes, labels, transparencies, custom-sized media, postcards, and heavy paper. Tray capacity equals approximately 100 sheets of standard paper or 10 standard envelopes. ● Adjustable 250-Sheet Tray 2 for standard sizes of paper. ● Top output bin (for printing face down). ● Rear output bin (for printing face up). ● Straight-through paper path capability from Tray 1 to the rear output bin.
Accessories	● Optional Tray 3 with a 250-sheet capacity. ● Enhanced Input Output (EIO) cards. ● Three dual in-line memory module (DIMM) slots. ● PostScript™ Level 2 Emulation (PS) DIMM. Factory installed on the 2100 M and 2100 TN.
PCL Printer Language and Fonts	● Fast printing performance, built-in Intellifont and TrueType scaling technologies, built-in HP-GL/2 vector graphics, and advanced imaging capabilities are benefits of the PCL 6 printer language. This also includes 45 scalable TrueType fonts and one bitmapped Line Printer font.
PS Language and Fonts	● The HP LaserJet 2100 M and 2100 TN printers include the HP PostScipt Level 2 printer language emulation with 35 built-in PS language fonts.
Automatic Language and I/O Switching	● When optional printer languages (such as PostScript emulation) are installed, the printer automatically determines and switches to the appropriate language for the print job. ● With I/O Switching the printer switches back and forth between active I/Os.

Table 1-1. Printer Description and Features (continued)

Wireless Infrared Printing	• Fast infrared (IR) printing when printing from an IrDA-compliant device, such as a laptop, notebook computer, or a Personal Digital Assistant (PDA). • JetSend IR enabled devices can also use the IR port.
Interface Connections	• IEEE-1284 compliant Type B parallel port Data Transfer Rate: approximately 4 MB/second • LocalTalk port • Enhanced Input/Output (EIO) Slot • Wireless Infrared port (IrDA compliant) Date Transfer Rate: approximately 4 MB/second
Networking	• The printer provides an EIO Slot for HP JetDirect print servers.
Enhanced Memory and Memory Expansion	• The HP LaserJet 2100 printer comes with 4 MB of memory and can be expanded to 52 MB using the three available memory (DIMM) slots. • The HP LaserJet 2100 M and 2100 TN printers come with 8 MB of memory and can be expanded to 40 MB with the two available memory (DIMM) slots. The third slot is used for the HP PostScript language DIMM.
Energy Savings	• The printer automatically conserves electricity by substantially reducing power consumption when not printing. • As an ENERGY STAR partner, Hewlett-Packard Company has determined that this product meets ENERGY STAR guidelines for energy efficiency.
Economical Printing	• EconoMode (600 dpi only), manual duplexing, and N-up printing lets the user save paper, toner, and time.
Duty Cycle	• Approximately 15,000 pages per month.

Table 1-2. Comparison of HP LaserJet 2100, 2100 M, and 2100 TN

	HP LaserJet 2100	**HP LaserJet 2100 M**	**HP LaserJet 2100 TN**
PS DIMM	Optional	Standard	Standard
Standard Memory Maximum Memory	4 MB 52 MB	8 MB 40 MB	8 MB 40 MB
JetDirect 600 N print server	Optional	Optional	Standard

Identification

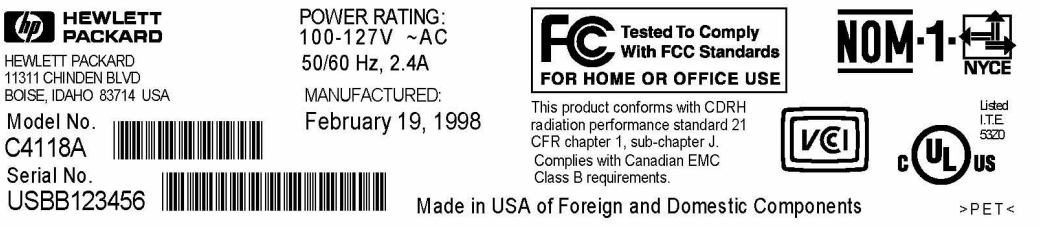
The serial number and the model number are listed on the identification label located on the rear output bin.

The serial number contains information about the Country of Origin, the Revision Level, the Production Code, and the production number of the printer.

As shown in figure 1-1, the label also contains power rating and regulatory information.

NOTE: These values vary by region.

Figure 1-1 Sample Identification Label



Specifications

Table 1-3. Physical Specifications

	HP LaserJet 2100	HP LaserJet 2100 with Optional Tray 3
Height	230 mm (9 in.)	309 mm (12.2 in.)
Width	406 mm (15.9 in.)	406 mm (15.9 in.)
Depth (body)	420 mm (16.5 in.)	420 mm (16.5 in.)
Weight (with toner cartridge)	11.5 kg (25.4 lbs)	14.4 kg (31.7 lbs)

Table 1-4. Electrical Specifications

	100-127V (+/- 10%) 50/60Hz (+/- 2Hz)	220-240V (+/- 10%) 50/60 Hz (+/- 2Hz)
Typical Power Consumption	Printing 225 W (average) Standby 12 W (instant power save) Power save mode 12 W Off mode 0 W	Printing 225 W (average) Standby 14 W (instant power save) Power save mode 14 W Off mode 0 W
Minimum recommended circuit capacity	5 Amps	2.5 Amps

WARNING! Power requirements are based on the region where the printer is sold. Do not convert operating voltages. This may damage the printer and void the product warranty.

Table 1-5. Environmental Specifications

	Operating Printing	Storage/Standby
Temperature (printer and toner cartridge)	15 degrees to 32.5 degrees C (59 degrees to 89 degrees F)	-20 degrees to 40 degrees C (-4 degrees to 104 degrees F)
Relative humidity	10% to 80%	10% to 90%

Table 1-6. Acoustic Emissions (Per ISO 9296)

	Operator Position	Bystander (1m)	Sound Power
Printing (HP LaserJet 2100 at 10 ppm)	L_{pAm} 55dB(A)	L_{pAm} 48dB(A)	L_{WAd} 6.2 bels(A)
Power Save In this mode, the printer is essentially quiet.			

External Assembly Locations

Figure 1-2 External Assembly Locations (1 of 4)

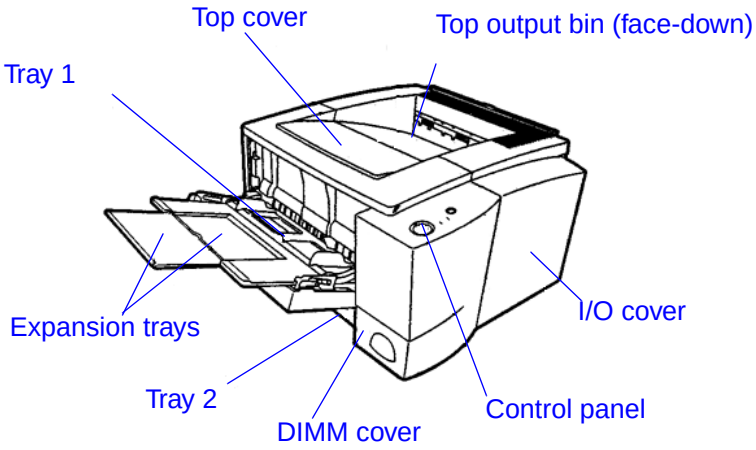


Figure 1-3 External Assembly Locations (2 of 4)

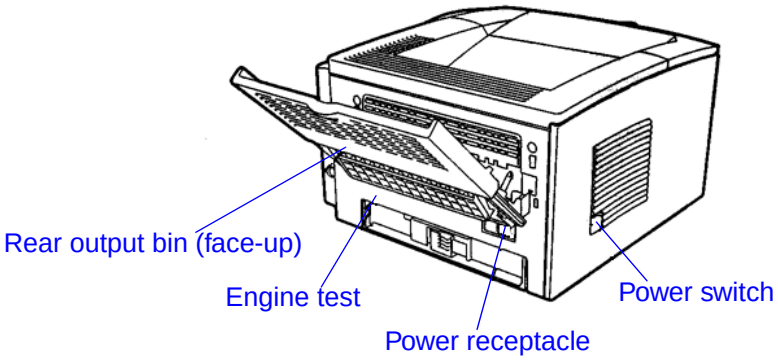


Figure 1-4 External Assembly Locations (3 of 4)

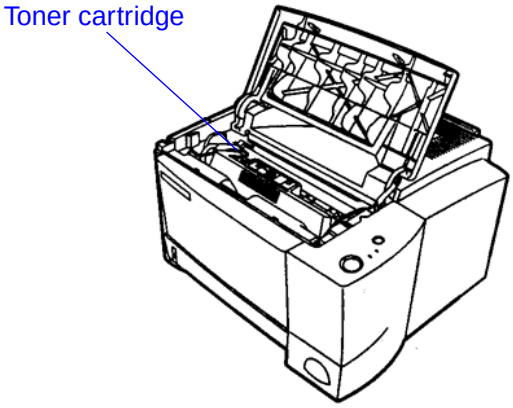
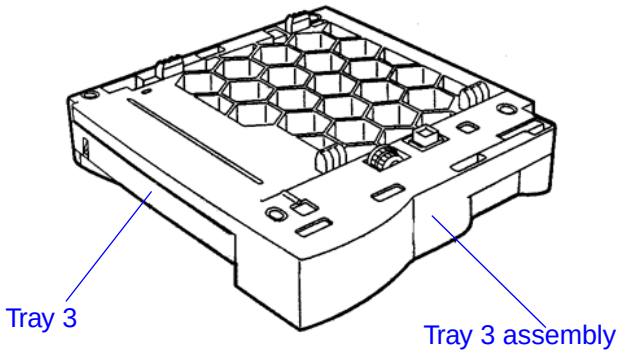


Figure 1-5 External Assembly Locations (4 of 4)



Internal Assembly Locations

Figure 1-6 **Internal Assembly Locations (1 of 2)**

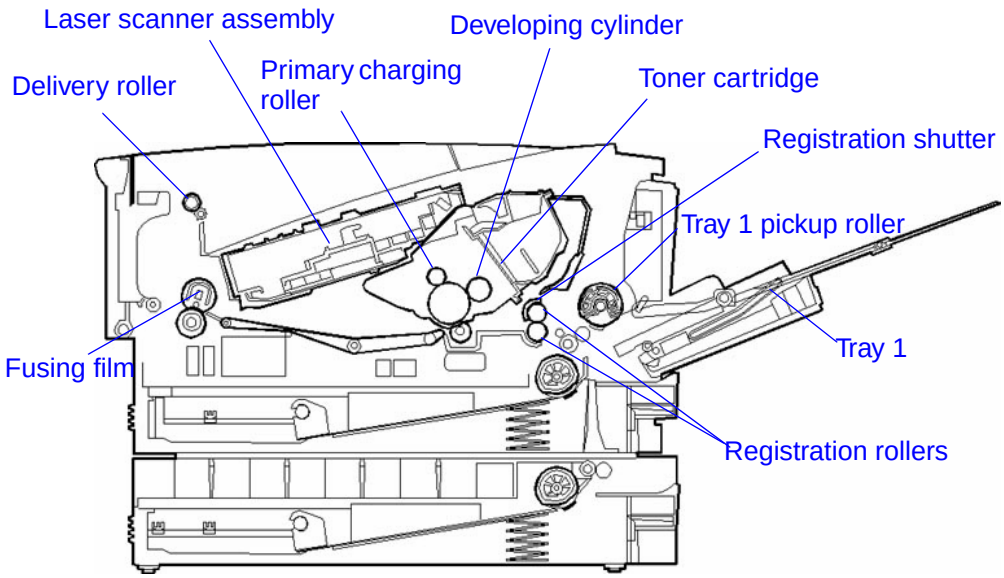
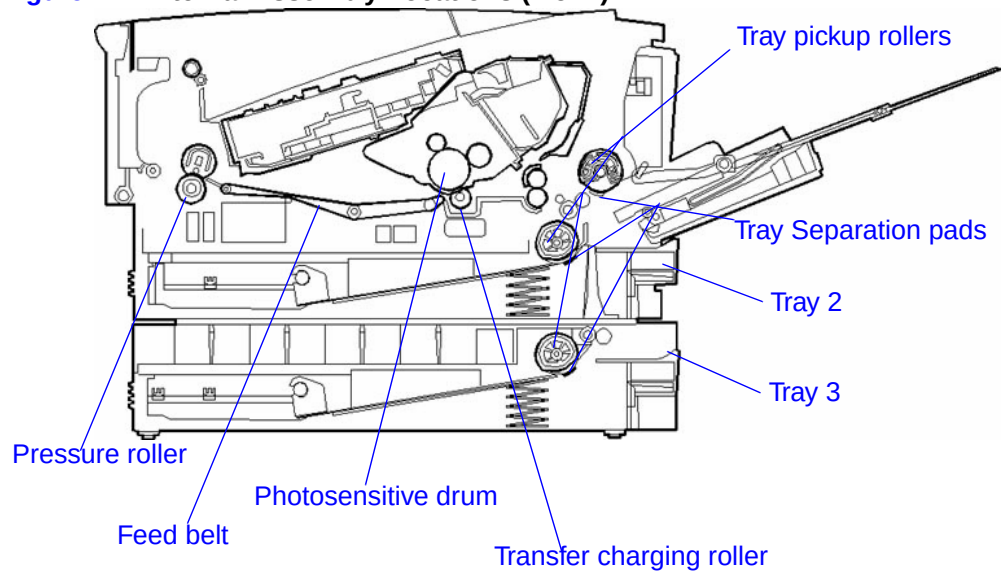


Figure 1-7 **Internal Assembly Locations (2 of 2)**



Safety Information

Laser Safety

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration has implemented regulations for laser products manufactured since August 1, 1976. Compliance is mandatory for products marketed in the United States. The printer is certified as a Class 1 laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968.

Since radiation emitted inside the printer is completely confined within protective housings and external covers, the laser beam cannot escape during any phase of normal user operation.

WARNING! Using controls, making adjustments, or performing procedures other than those specified in this service manual may result in exposure to hazardous laser radiation.

Laser Statement for Finland

LASERTURVALLISUUS

LUOKAN 1 LASERLAITE

KLASS 1 LASER APPARAT

HP LaserJet 2100 -laserkirjoitin on käyttäjän kannalta turvallinen luokan 1 laserlaite. Normaalissa käytössä kirjoittimen suojakotelointi estää lasersäteen pääsyn laitteen ulkopuolelle.

Laitteen turvallisuusluokka on määritetty standardin EN 60825-1 (1993) mukaisesti.

VAROITUS!

Laitteen käyttäminen muulla kuin käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteilylle.

VARNING!

Om apparaten används på annat sätt än i bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laserklass 1.

HUOLTO

HP LaserJet 2100 -kirjoittimen sisällä ei ole käyttäjän huollettavissa olevia kohteita. Laitteen saa avata ja huoltaa ainoastaan sen huoltamiseen koulutettu henkilö. Tällaiseksi huoltotoimenpiteeksi ei katsota väriainekasetin vaihtamista, paperiradan puhdistusta tai muita käyttäjän käsikirjassa lueteltuja, käyttäjän tehtäväksi tarkoitettuja ylläpitotoimia, jotka voidaan suorittaa ilman erikoistyökaluja.

VARO!

Mikäli kirjoittimen suojakotelo avataan, olet alttiina näkymättömälle lasersäteilylle laitteen ollessa toiminnassa. Älä katso säteeseen.

VARNING!

Om laserprinterns skyddshölje öppnas då apparaten är i funktion, utsättas användaren för osynlig laserstrålning. Betrakta ej strålen.

Tiedot laitteessa käytettävän laserdiodin säteilyominaisuuksista:

Aallonpituus 770-795 nm

Teho 5 mW

Luokan 3B laser

LED Safety

The infrared port on the control panel of this printer is classified as a Class 1 LED (light emitting diode) device according to International Standard IEC 825-1 (EN 60825-1). This device is not considered harmful, but the following precautions are recommended.

- Avoid direct eye exposure to the infrared LED beam.
- Be aware that the beam is invisible light and cannot be seen.
- Do not attempt to view the infrared LED beam with any type of optical device.

Declaration of Conformity

according to ISO/IEC Guide 22 and EN45014

Manufacturer's Name:	Hewlett-Packard Company
Manufacturer's Address:	11311 Chinden Boulevard Boise, Idaho 83714-1021, USA
declares that the product	
Product Name:	HP LaserJet 2100, 2100 M, 2100 TN
Model Number:	C4170A, C4171A, C4172A, C4793A
Product Options:	ALL

conforms to the following Product Specifications:

Safety:	IEC 950:1991+A1+A2+A3 / EN 60950:1992+A1+A2+A3	
	IEC 825-1:1993 / EN 60825-1:1994 Class 1 (Laser/LED)	
EMC:	CISPR 22:1993+A1 / EN 55022:1994 Class B[1]	
	EN 50082-1:1992	
	IEC 801-2:1991 / prEN 55024-2:1992 -	4 kV CD, 8 kV AD
	IEC 801-3:1984 / prEN 55024-3:1991 -	3 V/m
	IEC 801-4:1988 / prEN 55024-4:1992 -	0.5 kV Signal Lines
		1.0 kV Power Lines
	IEC 1000-3-2:1995 / EN61000-3-2:1995	
	IEC 1000-3-3:1994 / EN61000-3.3:1995	
	FCC Title 47 CFR, Part 15 Class B[2)] / ICES-003, Issue 2 / VCCI-2[1)]	
	AS / NZS 3548:1992 / CISPR 22:1993 Class B[1)]	

Supplementary Information:

The product herewith complies with the requirements of the following Directives and carries the CE-marking accordingly:

the EMC directive 89/336/EEC

the Low-Voltage Directive 73/23/EEC

The product was tested in a typical configuration with Hewlett-Packard Personal Computer Systems.

This Device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For Compliance Information ONLY, contact:

Australia Contact:	Product Regulations Manager, Hewlett-Packard Australia Ltd., 31-41 Joseph Street, Blackburn, Victoria 3130, Australia
European Contact:	Your Local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department HQ-TRE / Standards Europe, Herrenberger Straße 130, D-71034 Böblingen (FAX: +49-7031-14-3143)
USA Contact:	Product Regulations Manager, Hewlett-Packard Company, PO Box 15 Mail Stop 160, Boise, ID 83707-0015 (Phone: 208-396-6000)

Toner Safety

Composed of plastic and minute colored components, toner is a non-poisonous substance. If toner adheres to skin or clothes, remove as much of it as possible with dry tissue paper, and then wash with cold water. Hot water causes toner to gel and become difficult to remove.

NOTE: Avoid letting toner come into contact with vinyl because it easily breaks down the vinyl material.

Material Safety Data Sheet

The Toner Cartridge/Drum MSDS can be obtained by contacting the HP LaserJet Supplies web site at:

http://www.hp.com/go/msds

If access to the Internet is not available, call the U.S. HP FIRST (Fax Information Retrieval Service Technology) at (1) (800) 231-9300. Use Index number 7 for a listing of the Toner Cartridge/Drum Material/Chemical Safety Data Sheets. Non-US customers should refer to “Technical Assistance” (page 18) for phone numbers and information.

Ozone Emission

The printer uses charging rollers in the electrophotographic process and therefore generates no appreciable ozone gas (O_3).

Environmental Product Stewardship Program

Protecting the Environment

Hewlett-Packard Company is committed to providing quality products in an environmentally sound manner. This HP LaserJet printer has been designed with several attributes to minimize impacts on our environment.

This HP LaserJet printer design reduces:

Energy consumption

Energy usage drops to as little as 12 W (110V) and 14 W (220V) while in low-power (PowerSave) mode. Not only does this save natural resources, but it also saves money without affecting the high performance of this printer. This product qualifies for ENERGY STAR. ENERGY STAR is a voluntary program established to encourage the development of energy-efficient office products.

ENERGY STAR is a U.S. registered service mark of the U.S. EPA. As an ENERGY STAR partner, Hewlett-Packard Company has determined that this product meets ENERGY STAR Guidelines for energy efficiency.

Toner Consumption

EconoMode uses significantly less toner, which might extend the life of the toner cartridge.

Paper Use

Depending on the type of software program in use, users can request for a number of pages of their documents to be printed on one sheet of paper. This N-up printing practice and the printer's automatic/manual duplexing feature, which provides two-sided printing, can reduce paper usage and the resulting demands on natural resources.

The design of this HP LaserJet printer facilitates the recycling of:

Plastics

Plastic housing parts have markings according to international standards that enhance the ability to identify plastics for recycling purposes at the end of the printer's life.

HP LaserJet Printing Supplies

In many countries, this product's printing supplies (e.g., toner cartridge, drum, fuser) can be returned to HP through the HP Planet Partners Printing Supplies Environmental Program. An easy-to-use takeback component of the program is available in over 20 countries. Multi-lingual program information and instruction are included in every new HP LaserJet Toner Cartridge and Consumables box.

HP Planet Partners

Since 1990, the HP LaserJet Toner Cartridge Recycling Program has collected more than 12 million used LaserJet toner cartridges that otherwise might have been discarded in the world's landfills. The HP LaserJet toner cartridges go to a collection center and are bulk-shipped to our recycling partners who disassemble the cartridge parts for recycling. After a through quality inspection, minor parts, such as nuts, screws, and clips are reclaimed for use in new cartridges. Remaining materials are separated and converted into raw materials for use by other industries to make a variety of useful products.

Paper

This printer is suited for the use of recycled papers when the paper meets the guidelines outlined in the *HP LaserJet Printer Family Paper Specifications Guide*. Also, this printer is suitable for the use of recycled paper according to DIN 19 309.

The design of this HP LaserJet printer facilitates the recycling of:

Printer and Parts

HP provides a product return system for customers in Germany. Many of the functional parts are recovered, tested, and reused as fully warranted service parts. Used parts are not placed into new product manufacturing. Remaining product parts are recycled, if possible. For product return information, contact the local HP Sales and Service office.

To ensure longevity of the HP LaserJet printer, HP provides the following:

Extended warranty

HP SupportPack provides coverage for the HP hardware product and all HP-supplied internal components. The hardware maintenance covers a three-year period from date of the HP product purchase. The customer must purchase HP SupportPack within 90 days of the HP product purchase. Information on HP SupportPack is available in fax format by calling HP FIRST (fax-on-demand service). The document number is 9036. Customers should refer to the front of this manual for appropriate HP FIRST phone numbers and information.

Spare Parts and Consumables Availability

Spare parts and consumable supplies for this product will be made available for at least 5 years after production has stopped.

FCC Regulations

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If this equipment is not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation; the presence of interference can be determined by turning the equipment off and on. If this equipment does cause harmful interference to radio or television communications, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase distance between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is located.
- Consult the dealer or an experienced radio/television technician.

NOTE: Any changes or modifications to the printer that are not expressly approved by HP could void the user's authority to operate this equipment.

Use of a shielded interface cable is required to comply with the Class B limits of Part 15 of FCC rules.

Service Approach

Bench Repair Warranty

The warranty for this product is “return to bench” for a period of one year from the date of purchase. This means that customers needing warranty repair must return their printer to an HP repair center or an Authorized Service Provider (ASP).

HP Express Exchange

Through Customer Care Centers In the United States and Canada, customers have an option to initiate Express Exchange. Under this option, customers may have a factory refurbished printer sent to them within 24 hours.

1 The customer contacts the local HP Customer Care Center listed in the product documentation. A technician troubleshoots the situation and determines whether the printer has actually failed. If so, the technician refers the customer to the HP Service Center.

2 A representative from the service center requests product and customer information. In some regions, collateral may also be requested.

3 HP ships a refurbished replacement unit to arrive the next day. (Geographic distance might prevent next-day shipping.)

4 The customer sends the defective printer to Hewlett-Packard at HP's expense.

Customers with on-site support service provided by HP should work directly with the local Customer Care Center instead of following the steps outlined here.

Exchanged units carry the remainder of the original unit’s warranty or 90 days, whichever is greater. The faster turnaround from HP Express Exchange minimizes downtime over traditional service programs that require the user to ship the failed unit to the manufacturer, and then wait for it to be repaired and returned. Because HP pays the shipping charges, the user incurs no hidden costs for the service.

Ordering Parts

Field replaceable part numbers are listed in Chapter 8: Parts and Diagrams. Replacement parts can be ordered from HP’s Parts Direct Ordering or HP’s Parts Center Europe. Addresses and telephone numbers for both organizations are as follows:

Parts Direct Ordering	Parts Center Europe
Hewlett-Packard Company Support Materials Organization 8050 Foothills Blvd. Roseville, CA 95678 1-800-227-8164 (U.S. only)	Hewlett-Packard Company Parts Center Europe Wolf-Hirth Strasse 33 D-7030 Boeblingen, Germany (49 7031) 14-2253

Ordering Consumables

Consumables and accessories can be ordered directly from Hewlett-Packard. Telephone numbers for ordering consumables are as follows:

U.S.	1-800-538-8787
Canada	1-800-387-3154
Toronto	416-671-8383
United Kingdom	0734-441212
Germany	0130-3322

Ordering Related Documentation

The following table shows where to order related documentation. Telephone numbers for the various sources are as follows:

PDO (Parts Direct Ordering)	1-800-227-8164 (U.S. only)
PCE (Parts Center Europe)	49 7031 14-2253
HPD (HP's Distribution Center)	303-353-7650 (U.S. only)

Related Documentation

Description	Part Number
HP LaserJet Printer Family Paper Specification Guide	5040-9092
HP LaserJet 2100, 2100 M, and 2100 TN Printers User Guide	C4170-90901

Technical Assistance

HP ASAP

HP ASAP (Automated Support Access Program) provides free technical support information 24 hours a day, 7 days a week. HP ASAP includes HP FIRST and HP AUDIO-TIPS, which are both explained below. HP ASAP requires a touch-tone telephone.

HP FIRST

HP FIRST (Fax Information Retrieval Support Technology) is a telephone-in fax service providing technical information for HP LaserJet users as well as service personnel. Receiving a fax requires a group 3 facsimile machine or fax card. Service-related information includes:

- Service notes (HP Authorized dealers)
- Application notes
- Product data sheets
- Material Safety Data Sheets (MSDS)
- Typeface and accessory information
- Printer support software information
- Toner information
- Driver request form and Software Matrix

HP FIRST, U.S.

To use HP FIRST in the U.S. call HP ASAP and follow the instructions. The telephone number for HP ASAP in the U.S. is 1-800-333-1917. For all other areas, contact the local service provider.

HP FIRST, Europe

To use HP FIRST in Europe, call HP ASAP and follow the instructions. The telephone numbers for HP ASAP in Europe are as follows:

U.K.	0800-96-02-71
Belgium (Dutch)	078-111906
Switzerland (German)	155-1527
Netherlands	06-0222420
Germany	0130-810061
Austria	0660-8128
For English service outside the above countries, (31) 20-681-5792	

HP AUDIO-TIPS

HP AUDIO-TIPS, available within HP ASAP, is an interactive voice response system providing pre-recorded answers to the questions most frequently asked by HP LaserJet printer users. Helpful “System Maps” to the HP AUDIO-TIPS recordings are available by fax through HP FIRST.

HP Support

<table>
<tr><td rowspan="3">Online Services:</td><td colspan="2">World Wide Web URL - Printer drivers, updated HP printer software, plus product and support information may be obtained from the following URLs:

in the U.S.: http://www.hp.com
in Europe: http://www2.hp.com</td></tr>
<tr><td colspan="2">America Online - America Online/Bertelsmann is available in the U.S., France, Germany, and UK - Printer drivers, updated HP printer software, and support documentation to help answer questions about HP products are available. Use Keyword HP to start the tour or call 1-800-827-6364 preferred customer # 1118 to subscribe. In Europe, call the appropriate number below:

Austria: 0222 58 58 485
France: ++353 1 704 90 00
Germany: 0180 531 31 64
Switzerland: 0848 80 10 11
United Kingdom: 0800 279 1234</td></tr>
<tr><td colspan="2">CompuServe - Printer drivers, updated HP printer software, and interactive sharing of technical information with other members is available on CompuServe’s “HP User’s forums” (GO HP), or call 1-800-524-3388 and ask for representative #51 to subscribe. (CompuServe is also available in the U.K., France, Belgium, Switzerland, Germany, and Austria.)</td></tr>
<tr><td rowspan="2">Obtaining software utilities, drivers, and electronic Information for U.S. and Canada:</td><td>Phone:
(805) 257-5565

Fax:
(805) 257-6866</td><td>Mail:
Hewlett-Packard Co.
P.O. Box 1754
Greeley, CO 80632
U.S.A.</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>For European English:</td><td colspan="2">For U.K., call (44) (142) 986-5511. For Ireland and outside U.K., call (44) (142) 986-5511.</td></tr>
<tr><td>HP Service Information:</td><td colspan="2">To locate HP-Authorized Dealers, call 1-800-243-9816 (U.S.) or 1-800-387-3867 (Canada).</td></tr>
<tr><td>HP Service Agreements:</td><td colspan="2">Call 1-800-835-4747 (U.S.) or 1-800-268-1221 (Canada).
Extended Service 1-800-446-0522.</td></tr>
</table>

Customer Support Worldwide

Customer Support and Product Repair Assistance for the U.S. and Canada:	Call (1) (208) 323-2551 Monday through Friday from 6 am to 10 pm, Saturday 9 am to 4 pm (Mountain Time). Call 1-800-243-9816 to locate the nearest HP-Authorized service provider, or call 208-223-2551 for HP centralized service dispatch.

European Customer Support Center Language and In-Country Options Available
Open Monday through Friday 8:30–18:00 CET

English	Ireland: (353) (1) 662-5525	**Norwegian**	Norway: (47) 2211-6299
	UK: (44) (171) 512-5202	**Danish**	Denmark: (45) 3929-4099
	International: (44) (171) 512-5202	**Finnish**	Finland: (358) (9) 0203-47288
		Swedish	Sweden: (46) (8) 619-2170
Dutch	Belgium: (32) (2) 626-8806	**Italian**	Italy: (39) (2) 264-10350
	Netherlands: (31) (20) 606-8751	**Spanish**	Spain: (34) (90) 232-1123
French	France: (33) (01) 43-62-3434	**Polish**	Poland: (48-22) 608-77-00
	Belgium: (32) (2) 626-8807	**Portuguese**	Portugal: (351) (1) 441-7199
	Switzerland: (41) (84) 880-1111		
German	Germany: (49) (180) 525-8143		
	Austria: (43) (1) 0660-6386		

In-country support numbers: If the desired country is not listed below, see "Worldwide Sales and Service Offices" (page 21) for more information.

Argentina	787-8080	Mexico (Mexico City)	01 800-22147
Brazil	022-829-6612	Mexico (outside Mexico City)	01 800-90529
Canada	(1) (208) 323-2551	Poland	(48-22) 608-77-00
Chile	800-360999	Portugal	(351) (1) 301-7330
Czech Republic	(42) (2) 613-07111	Russia	(7) (95) 923-5001
Greece	(30) (1) 689-6411	Turkey	(90) (1) 224-5925
Hungary	(36) (1) 343-0310		

Worldwide Sales and Service Offices

Argentina	**Australia**
Hewlett-Packard Argentina S.A. Montañeses 2140/50/60 1428 Buenos Aires Phone: (54) (1) 787-7100 Fax: (54) (1) 787-7213	Hewlett-Packard Australia Ltd. 31-41 Joseph Street Blackburn, VIC 3130 Phone: (61) (3) 272-2895 Fax: (61) (3) 898-7831 Hardware Repair Center: Phone: (61) (3) 272-8000 Extended Warranty Support: Phone: (61) (3) 272-2577 Customer Information Center: Phone: (61) (3) 272-8000
Austria	**Belgium**
Hewlett-Packard GmbH Lieblgasse 1 A-1222 Vienna Phone: (43) (1) 25000-555 Fax: (43) (1) 25000-500	Hewlett-Packard Belgium S.A. NV Boulevard de la Woluwe-Woluwedal 100-102 B-1200 Brussels Phone: (32) (2) 778-31-11 Fax: (32) (2) 763-06-13
Brazil	**Canada**
Edisa Hewlett-Packard SA Alameda Rio Negro 750 06454-050 Alphaville - Barueri-SP Phone: (55) (11)- 7296-8000	Hewlett-Packard (Canada) Ltd. 17500 Trans Canada Highway South Service Road Kirkland, Quèbec H9J 2X8 Phone: (1) (514) 697-4232 Fax: (1) (514) 697-6941
Canada	**Chile**
Hewlett-Packard (Canada) Ltd. 5150 Spectrum Way Mississauga, Ontario L4W 5G1 Phone: (1) (905) 206-4725 Fax: (1) (905) 206-4739	Hewlett-Packard de Chile Avenida Andres Bello 2777 of. 1 Los Condes Santiago, Chile
China	**Colombia**
China Hewlett-Packard Co. Ltd. Level 5, West Wing Office China World Trade Center No. 1, Jian Guo Men Wai Avenue Beijing 100004 Phone: (86) (10) 6505-3888,x. 5450 Fax: (86) (10) 6505-1033 Hardware Repair Center and Extended Warranty Support: Phone: (86) (10) 6262-5666x. 6101/2 (86) (10) 6261-4167	Hewlett-Packard Colombia Calle 100 No. 8A -55 Torre C Oficina 309 Bogotá, Colombia
Czech Republic	**Denmark**
Hewlett-Packard s. r. o. Novodvorsk· 82 CZ-14200 Praha 4 Phone: (42) (2) 613-07111 Fax: (42) (2) 471-7611	Hewlett-Packard A/S Kongevejen 25 DK-3460 Birkerød Denmark Phone: (45)3929 4099 Fax: (45) 4281-5810

Far East Region	Finland
Hewlett-Packard Asia Pacific Ltd. 17-21/F Shell Tower, Times Square 1 Matheson Street, Causeway Bay Hong Kong Phone: (852) 2599-7777 Fax: (852) 2506-9261 Hardware Repair Center: Phone: (852) 2599-7000 Extended Warranty Support: Phone: (852) 2599-7000 Customer Information Center: Phone: (852) 2599-7066	Hewlett-Packard Oy Piispankalliontie 17 FIN-02200 Espoo Phone: (358) (9) 887-21 Fax: (358) (9) 887-2477
France	**Germany**
Hewlett-Packard France 42 Quai du Point du Jour F-92659 Boulogne Cedex Phone: (33) (146) 10-1700 Fax: (33) (146) 10-1705	Hewlett-Packard GmbH Herrenberger Straße 130 71034 Böblingen Phone: (49) (180) 532-6222 (49) (180) 525-8143 Fax: (49) (180) 531-6122
Greece	**Hungary**
Hewlett-Packard Hellas 62, Kifissias Avenue GR-15125 Maroussi Phone: (30) (1) 689-6411 Fax: (30) (1) 689-6508	Hewlett-Packard Magyarorszag Kft. Erzsébet királyne útja 1/c. H-1146 Budapest Phone: (36) (1) 343-0550 Fax: (36) (1) 122-369 Hardware Repair Center: Phone: (36) (1) 343-0312 Customer Information Center: Phone: (36) (1) 343-0310
India	**Italy**
Hewlett-Packard India Ltd. Paharpur Business Centre 21 Nehru Place New Delhi 110 019 Phone: (91) (11) 647-2311 Fax: (91) (11) 646-1117 Hardware Repair Center and Extended Warranty Support: Phone: (91) (11) 642-5073 (91) (11) 682-6042	Hewlett-Packard Italiana SpA Via Giuseppe di Vittorio, 9 Cernusco Sul Naviglio I-20063 (Milano) Phone: (39) (2) 921-21 Fax: (39) (2) 921-04473
Japan	**Korea**
Hewlett-Packard Japan, Ltd. 3-29-21 Takaido-higashi Suginami-ku, Tokyo 168 Phone: (81) (3) 3335-8333 Fax: (81) (3) 3335-8338 Hardware Repair Center: Phone: (81) (4) 7355-6660 Fax: (81) (4) 7352-1848	Hewlett-Packard Korea 25-12, Yoido-dong, Youngdeungpo-ku Seoul 150-010 Phone: (82) (2) 769-0114 Fax: (82) (2) 784-7084 Hardware Repair Center: Phone: (82) (2) 3270-0700 (82) (2) 707-2174 (DeskJet) (82) (2) 3270-0710 (Hardware) Extended Warranty Support: Phone: (82) (2) 3770-0365 (Bench) (82) (2) 769-0500 (Onsite)

Latin American Headquarters	**Mexico**
5200 Blue Lagoon Drive Suite 950 Miami, FL 33126,USA Phone: (1) (305) 267-4220	Hewlett-Packard de México, S.A. de C.V. Prolongacion Reforma No. 700 Lomas de Santa Fe 01210 México, D.F. Phone: 01-800-22147 Outside Mexico City Phone: 01 800-90529
Middle East/Africa	**Netherlands**
ISB HP Response Center Hewlett-Packard S.A. Rue de Veyrot 39 P.O. Box 364 CH-1217 Meyrin - Geneva Switzerland Phone: (41) (22) 780-4111	Hewlett-Packard Nederland BV Startbaan 16 NL-1187 XR Amstelveen Postbox 667 NL-1180 AR Amstelveen Phone: (31) (020) 606-87-51 Fax: (31) (020) 547-7755
New Zealand	**Norway**
Hewlett-Packard (NZ) Limited Ports of Auckland Building Princes Wharf, Quay Street P.O. Box 3860 Auckland Phone: (64) (9) 356-6640 Fax: (64) (9) 356-6620 Hardware Repair Center and Extended Warranty Support: Phone: (64) (9) 0800-733547 Customer Information Center: Phone: (64) (9) 0800-651651	Hewlett-Packard Norge A/S Postboks 60 Skøyen Drammensveien 169 N-0212 Oslo Phone: (47) 2273-5600 Fax: (47) 2273-5610
Poland	**Russia**
Hewlett-Packard Polska Al. Jerozolimskic 181 02-222 Warszawa Phone: (48-22) 608-7700 Fax: (48-22) 608-7600	AO Hewlett-Packard Business Complex Building #2 129223, Moskva, Prospekt Mira VVC Phone: (7) (95) 928-6885 Fax: (7) (95) 974-7829
Singapore	**Spain**
Hewlett-Packard Singapore (Sales) Pte Ltd 450 Alexandra Road Singapore (119960) Phone: (65)275-3888 Fax: (65)275-6839 Hardware Repair Center and Customer Information Center: Phone: (65) 272-5300 Extended Warranty Support: Phone: (65) 272-5333	Hewlett-Packard Española, S.A. Carretera de la Coruña km 16.500 E-28230 Las Rozas, Madrid Phone: (34) (1) 626-1600 Fax: (34) (1) 626-1830
Sweden	**Switzerland**
Hewlett-Packard Sverige AB Skalholtsgatan 9 S-164 97 Kista Phone: (46) (8) 444-2000 Fax: (46) (8) 444-2666	Hewlett-Packard (Schweiz) AG In der Luberzen 29 CH-8902 Urdorf/Zürich Phone: (41) (084) 880-11-11 Fax: (41) (1) 753-7700 Warranty Support: 0800-55-5353

Taiwan	Thailand
Hewlett-Packard Taiwan Ltd.| 8th Floor 337, Fu-Hsing North Road Taipei, 10483 Phone: (886)(02)717-0055 FAX: (886)(02)514-0276 Hardware Repair Center, call: North (886)(02) 717-9673 Central (886)(04) 327-0153 South (886)(080)733-733 Extended Warranty Support Contact: Phone: (886)(02) 714-8882	Hewlett-Packard (Thailand) Ltd. 23-25/f Vibulthani Tower II| 2199 Rama 4 Rd, Klongton Klintoey, Bangkok 10110 Thailand Phone: (66) (2) 666-3900-34 Fax: (66) (2) 666-3935-37 Hardware Repair Center and Extended Warranty Support Contact: Phone: (66) (2) 661-3900 ext. 6001/6002 Customer Information Center: Phone: (66) (2) 661-3900 ext. 3211 Fax: (66) (2) 661-3943
Turkey	**United Kingdom**
Hewlett-Packard Company Bilgisayar ve Ölçüm Sistemleri A.S. 19 Mayis caddesi Nova Baran Plaza K.12 80220 Sisli-Istanbul Phone: (90) (212) 224-5925 Fax: (90) (212) 224-5939	Hewlett-Packard Ltd. Cain Road Bracknell Berkshire RG12 1HN Phone: (44) (134) 436-9222 Fax: (44) (134) 436-3344
Venezuela	
Hewlett-Packard de Venezuela S.A. Los Ruices Norte 3A Transversal Edificio Segre Caracas 1071 Phone: (58) (2) 239-4244 Fax: (58) (2) 239-3080	

2 Operating Requirements

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Site Requirements

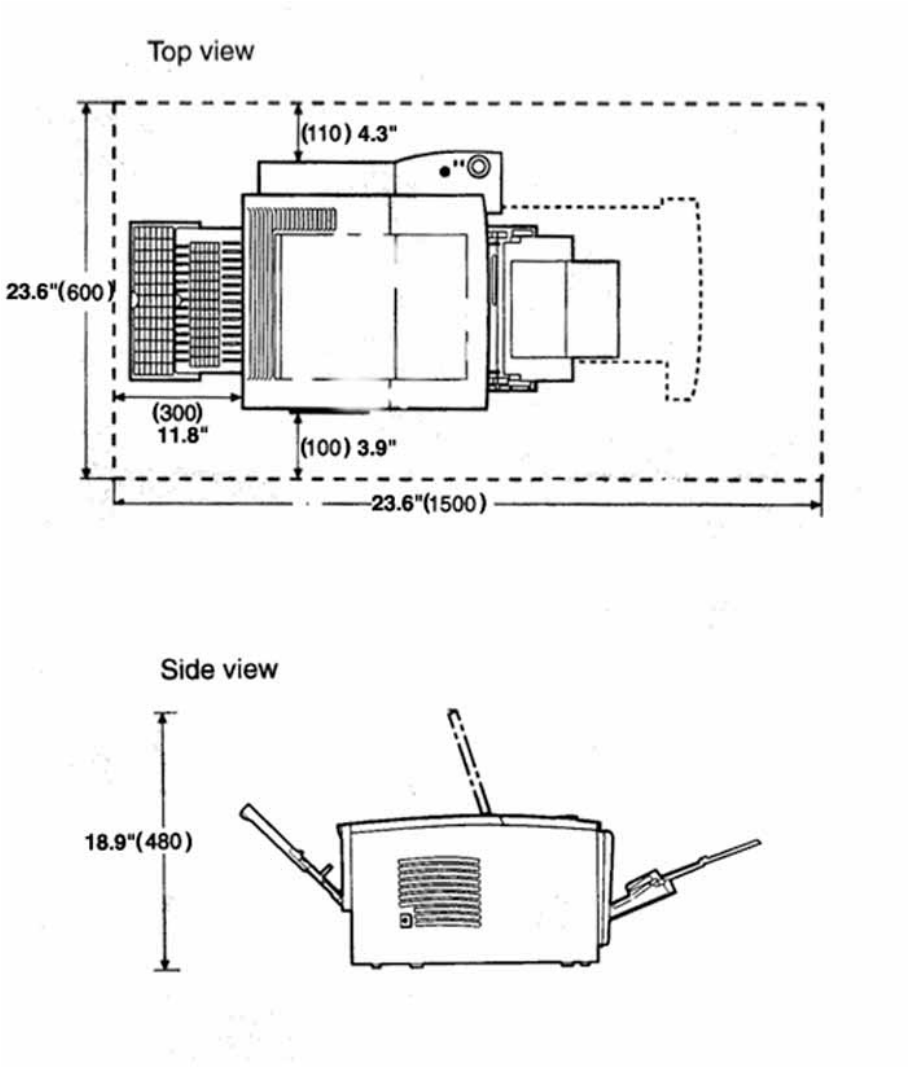
Operating Environment

The electrical and environmental specifications listed in “Specifications” (page 5) must be maintained to ensure the proper operation of this printer. Consider the following points before installing the printer:

- Install in a well-ventilated, dust-free area.
- Install on a level, flat, and continuous surface which can support the printer’s weight. Make sure all four printer feet are level. Do not install on carpet or other soft surfaces.
- Ensure adequate power supply circuitry. Electrical specifications are listed in “Specifications” (page 5).
- Install where there is stable temperature and humidity, with no abrupt changes (away from water sources, humidifiers, air conditioners, refrigerators, or other major appliances). Environmental specifications are listed in “Specifications” (page 5).
- Install away from direct sunlight, areas with vibration, open flames, ultrasonic heaters, ammonia fumes, or magnets and devices that emit a magnetic field. If the printer is placed near a window, make sure the window has a curtain or blind to block any direct sunlight.
- Maintain enough space around the printer for proper access and ventilation. See “Printer Space Requirements” (page 27) for more information.

Printer Space Requirements

Figure 2-1 Printer Space Requirements



Media Specifications

General Media Specifications

NOTE: **Advise users always to test a sample of paper before purchasing large quantities.** Paper suppliers should understand the requirements specified in the *HP LaserJet Printer Family Paper Specification Guide* and this chapter.

The HP LaserJet 2100 printer accepts a variety of media, such as cut-sheet paper (including up to 100% recycled fiber content paper), envelopes, labels, transparencies, and custom-size paper. Properties such as weight, composition, grain, and moisture content are important factors affecting printer performance and output quality. Paper that does not meet the guidelines outlined in this manual can cause the following problems:

- Poor print quality.
- Increased paper jams.
- Premature wear on the printer, requiring repair.

NOTE: Some paper may meet all of the guidelines in this manual and still not produce satisfactory results. This might be the result of improper handling, unacceptable temperature and humidity levels, or other variables over which Hewlett-Packard has no control.

CAUTION: Using paper that does not meet HP specifications may cause problems for the printer, requiring repair. This repair is not covered by the Hewlett-Packard warranty or service agreements.

Guidelines for Selecting Paper

To achieve the best possible print quality, use only high-quality, copier-grade 24 lb (90 g/m^2) paper. Make sure the paper is of good quality, and free of cuts, nicks, tears, spots, loose particles, dust, wrinkles, voids, and curled or bent edges.

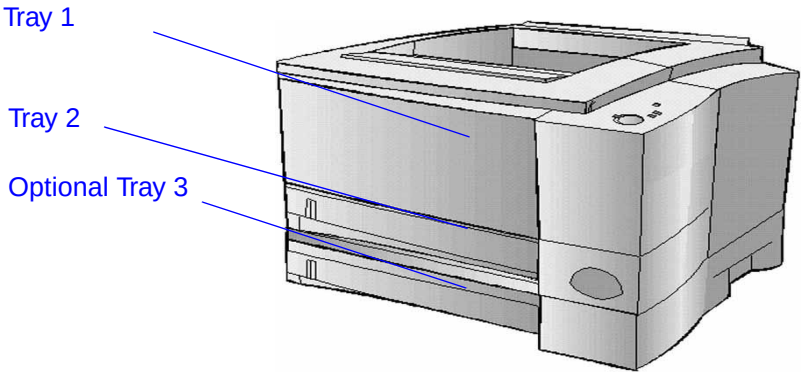
The following problems with paper can cause print quality deviations, jamming, or even damage to the printer.

Table 2-1. Guidelines for Selecting Paper

Symptom	Problem with Paper	Solution
Poor print quality or toner adhesion Problems with feeding	Too moist, too rough, too smooth, or embossed; faulty paper lot	Try another kind of paper, between 100-250 Sheffield, 4-6% moisture content
Dropouts, jamming, curl	Stored improperly	Store paper flat in its moisture-proof wrapping
Increased gray background shading/printer wear	Too heavy	Use lighter paper, open the rear output bin
Excessive curl problems with feeding	Too moist, wrong grain direction or short-grain construction	Open the rear output bin Use long-grain paper
Jamming, damage to printer	Cutouts or perforations	Do not use paper with cutouts or perforations
Problems with feeding	Ragged edges	Use good quality paper

Media Input Options

The printer comes with two paper trays. By default, the printer draws first from Tray 1. If Tray 1 is empty, the printer draws from Tray 2 (or optional Tray 3 if it is installed).



Tray 1 Media Sizes

Tray 1 adjusts for sizes from 76 by 127 mm (3 by 5 inches) to 216 by 356 mm (8.5 by 14 inches). Tray 1 should be used when printing the following:

- Envelopes
- Labels
- Transparencies
- Custom-sized media or cardstock
- Postcards

Table 2-2. Tray 1 Media Sizes

Tray 1	Dimensions	Weight	Capacity
Minimum Size (custom)	76 by 127 mm (3 by 5 in.)	60 to 163 g/m^2 (16 to 43 lb Bond)	100 sheets of 80 g/m^2 (20 lb Bond) paper
Maximum Size (custom)	216 by 356 mm (8.5 by 14 in.)		
Transparency	Same as minimum and maximum paper sizes listed above.	Thickness: .10 to .14 mm (0.0039 to 0.0055 in.)	75 typical
Labels		Thickness: .10 to .14 mm (0.0039 to 0.0055 in.)	50 typical
Envelopes		Up to 90 g/m^2 (16-24 lb)	up to 10

NOTE: The printer supports a wide range of media sizes. Check the printer software for supported sizes. Capacity may vary depending on media weight and thickness, and environmental conditions. Smoothness should be between 100 to 250 (Sheffield).

For information about measuring basis weight, see “Basis Weight Field Test” (page 38).

For information about measuring caliper, see “Caliper Field Test” (page 39).

For information about smoothness, see “Paper Finish Field Test” (page 40)

NOTE: Users may experience some paper jams when using any media with a length less than 178 millimeters (7 inches.). This may be caused by paper that has been affected by environmental conditions. For optimum performance, make sure that users are storing and handling the paper correctly.

Tray 2 and Optional Tray 3 Paper Sizes

Tray 2 and optional Tray 3 have settings for the paper sizes shown in the following table. Use only standard copier paper when printing from Tray 2 or optional Tray 3. Other types of printable media might jam when printing from Tray 2 or optional Tray 3.

Table 2-3. Tray 2 and Optional Tray 3 Paper Sizes

Tray 2 or Tray 3	Dimensions	Weight	Capacity
Letter	216 by 279 mm (8.5 by 11 in.)	60 to 105 g/m^2 (16 to 28 lb bond)	250 sheets of (80 g/m^2) (20 lb bond) paper
A4	210 by 297 mm (8.3 by 11.7 in.)		
Executive	191 by 267 mm (7.3 by 10.5 in.)		
Legal	216 by 356 mm)8.5 by 14 in.)		
B5 (ISO)	176 by 250 mm (6.9 by 9.9 in.)		
B5 (JIS)	182 by 257 mm (7.2 by 10 in.)		
A5	148 by 210 mm (5.8 by 8.2 in.)		
8.5 x 13 in.	216 by 330 mm (8.5 by 13 in.)		

NOTE: Capacity may vary depending on media weight and thickness, and environmental conditions.

For information about measuring basis weight, see “Basis Weight Field Test” (page 38).

Envelope Specifications

Envelope construction is critical. Envelope fold lines can vary considerably, not only between manufacturers, but also within a box from the same manufacturer. Successful printing on envelopes depends upon the quality of the envelopes. When selecting envelopes, consider the following components:

- **Weight:** The weight of the envelope paper should not exceed 105 g/m^2 (24 lb) or jamming may occur.
- **Construction:** Prior to printing, envelopes should lie flat with less than 6 mm (0.25 in.) curl, and should not contain air.
- **Condition:** Envelopes should not be wrinkled, nicked, or otherwise damaged.
- **Temperature:** Use envelopes that are compatible with the heat and pressure of the printer.
- **Size:** Use only envelopes within the following size ranges.

Minimum	Maximum
76 by 127 mm (3 by 5 in.)	216 by 356 mm (8.5 by 14 in.)

NOTE: Use only Tray 1 to print envelopes.

Some paper jams might occur when using any media with a length less than 178 mm (7 in.). This might be caused by paper that has been affected by environmental conditions.

Envelopes might meet the general specifications listed in table 2-4 and still not print satisfactorily because of the printing environment or other variables over which HP has no control.

Table 2-4. Envelope Specifications

Description	Specification
Paper	Paper used for envelope construction must meet the paper specifications listed in this manual and the *HP LaserJet Printer Paper Specifications Guide* (except for those listed below).
Basis Weight	16 to 27# (60 to 100 g/m2), single thickness. Jamming might result if 27# (100 g/m^2) is exceeded. See “Basis Weight Field Test” (page 38).
Finish	Avoid using envelopes with adhesive exposed to the printer. Envelopes must be folded accurately (+/- 0.04 inch) so that there are no more than two thicknesses of paper anywhere along the leading edge. All folds must be well scored and sharply creased, and construction must be tight (not baggy). Avoid using envelopes that are stuck together with excess seam gum.
Fusing Compatibility	All inks, adhesives, and other materials used in the envelope must be compatible with the heat and pressure of the fusing process. Materials must not discolor, melt, offset, or release hazardous emissions when heated to 200 degrees Celsius (392 degrees Fahrenheit) for 0.1 second. See “Fusing Compatibility Field Test” (page 42).
Curl (Pre-Printed)	Envelopes must lie flat, with no more than 5 mm (0.2 inch) curl across the entire surface. See “Curl Field Test” (page 41).
Caliper	0.084 to 0.14 mm (3.3 to 5.5 mils), single thickness. See “Caliper Field Test” (page 39).

Envelopes with Adhesive Strips or Flaps

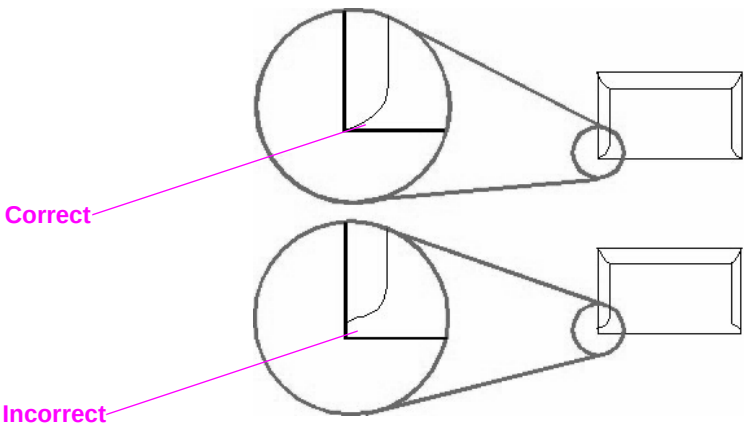
Envelopes with a peel-off adhesive strip or with more than one flap that folds over to seal must use adhesives compatible with the heat and pressure in the printer. The extra flaps and strips might cause wrinkling, creasing, or jams and may even damage the fuser.

Envelope Storage

Proper storage of envelopes contributes to print quality. Envelopes should be stored flat. If air is trapped in an envelope, creating an air bubble, then the envelope may wrinkle during printing.

Envelopes with Double Side Seams

Double side-seam construction has vertical seams at both ends of the envelope rather than diagonal seams. This style may be more likely to wrinkle. Be sure the seam extends all the way to the corner of the envelope as illustrated below.



Envelope Margins

The following gives typical address margins for a commercial #10 or DL envelope.

Table 2-5. Envelope Margins

Type of Address	Top Margin	Left Margin
Return address	15 mm (0.6 in.)	15 mm (0.6 in.)
Delivery address	51 mm (2 in.)	89 mm (3.5 in.)

NOTE: For the best print quality, position margins no closer than 15 mm (0.6 in.) from the edges of the envelope.

Avoid printing over the area where the envelope seams meet.

Label Specifications

When selecting labels, consider the quality of each component:

- **Adhesives:** The adhesive material should be stable at 200 degrees C (392 degrees F), which is the printer's fusing temperature.
- **Arrangement:** Only use labels with no exposed backing between them. Labels can peel off sheets with spaces between the labels, causing serious jams.
- **Curl:** Prior to printing, labels must lie flat with no more than 13 mm (.5 in.) of curl in any direction.
- **Condition:** Do not use labels with wrinkles, bubbles, or other indications of separation.

CAUTION: To avoid damaging the printer, use only labels recommended for laser printers, such as HP-brand labels.

To prevent serious jams, always use Tray 1 to print labels and always use the rear output bin.

Never print on the same sheet of labels more than once or print on a partial sheet of labels.

Table 2-6. Label Specifications

Description	Specification
Adhesive	Must not be on any external surfaces of the label before, during, or after printing. Label construction and die-cutting must not let labels peel off during transport, printing, or fusing.
Caliper	Must not exceed 0.19 millimeter (0.007 inches). See "Caliper Field Test" (page 39).
Curl	In ream: flat within 5 millimeter (0.2 inches). See "Curl Field Test" (page 41).
Surface Resistivity	2.0 to 15 X 10 to the 10th ohm square. See "Tools and Suppliers" (page 42).
Volume Resistivity	1.2 to 15 X 10 to the 11th ohm-centimeter. See "Tools and Suppliers" (page 42)
Finishing Precision	Cut sheet within 0.79 millimeters (0.031 inches) of nominal and +0.20 degrees square.
Fusing Compatibility	All adhesives, carrier sheets, top sheets, and other materials used in label construction must be compatible with the heat and pressure of the fusing process. Materials must not discolor, melt, offset, or release hazardous emissions when heated to 200 degrees Celsius (392 degrees Fahrenheit) for 0.1 second. See "Fusing Compatibility Field Test" (page 42).
Packaging	Moisture-proof wrap to preserve properties.
Shelf Life	One year, maximum, stored at 22 degrees Celsius (72 degrees Fahrenheit) and 50 percent relative humidity.

Transparency Specifications

Transparencies used in the printer must be able to withstand 200 degrees C (392 degrees F), the printer's fusing temperature. To avoid damaging the printer, use only transparencies recommended for use in laser printers, such as HP-brand transparencies, and print transparencies to the top output bin.

Table 2-7. Transparency Specifications

Description	Specification
Surface Resistivity	2.0 to 15 X 10 to the 10th ohm square. See "Tools and Suppliers" (page 42).
Volume Resistivity	1.2 to 15 X 10 to the 11th ohm-centimeter. See "Tools and Suppliers" (page 42).
Finishing Precision	Cut sheet within 0.79 millimeters (0.031 inches) of nominal and +0.20 degrees square.
Fusing Compatibility	Transparency materials must be compatible with the heat and pressure of the fusing process. Materials must not discolor, melt, offset, or release hazardous emissions when heated to 200 degrees Celsius (392 degrees Fahrenheit) for 0.1 second. See "Fusing Compatibility Field Test" (page 42).
Caliper	0.100 to 0.110 mm (3.9 to 4.3 mils). See "Caliper Field Test" (page 39).

Storing Print Media

Ideally, the printing and paper storage environment should be at or near room temperature, and not too dry or too humid. Remember paper is hygroscopic; it absorbs and loses moisture rapidly.

Heat works with humidity to damage paper. Heat causes the moisture in paper to evaporate, while cold causes it to condense on the sheets. Heating systems and air conditioners remove most of the humidity from a room. As a paper package is opened and used, it loses moisture, causing streaks and smudging. Humid weather or water coolers can cause the humidity to increase in a room. As paper is opened and used it absorbs any excess moisture, causing light print and dropouts. Also, as paper loses and gains moisture it can distort. This can cause paper jams.

As a result, paper storage and handling are as important as the paper-making process itself. Paper storage environmental conditions directly affect the feed operation.

Users should not purchase more paper than can be easily used in a short time (about 3 months). Paper stored for long periods may experience heat and moisture extremes, which can cause damage. Planning is important to prevent damage to a large supply of paper.

Unopened paper in sealed reams can remain stable for several months before use. Opened packages of paper have more potential for environmental damage, especially if they are not wrapped with a moisture-proof barrier.

The paper storage environment should be properly maintained to ensure optimum printer performance. The required condition is 20 degrees to 24 degrees C (68 degrees to 75 degrees F), with a relative humidity of 45% to 55%. The following guidelines should be helpful when evaluating the paper's storage environment:

- Paper should be stored at or near room temperature.
- The air should not be too dry or too humid (due to the hygroscopic properties of paper).
- The best way to store an opened ream of paper is to rewrap it tightly in its moisture-proof wrapping. If the printer environment is subject to extremes, unwrap only the amount of paper to be used during the day's operation to prevent unwanted moisture changes.

Shipping Print Media

When shipping print media through different environments, plastic wrap all cartons on the shipping pallet. When shipping media across bodies of water, wrap individual cartons as well. Packaging must protect the media from physical damage.

Fillers

Additional chemicals and fillers are frequently added to paper during the manufacturing process. These may affect the paper strength, pick resistance, printability, bulk, feel and color.

An emulsion containing wax, rosin, starch, or other non-water soluble materials is added to the paper pulp to help control penetration by water and other liquids. Dyes are added and the paper may be bleached. Bleaching is a multi-step process using such chemicals as hydrogen peroxide and chlorine dioxide. This transforms the paper from its original brownish state to the desired color.

Finely ground fillers, such as clay, talc, and calcium carbonate may be added to even out the “peaks and valleys” which occur in the paper mixture, and serve as brighteners. Over time, these fillers can build up on internal assemblies of the printer such as rollers or the toner cartridge. This buildup can eventually cause paper jams and print defects. To minimize this risk, periodically clean the printer according to the procedures covered in Chapter 4: Printer Maintenance.

Testing Media Specifications

The following tests describe ways to qualify the media with respect to the specifications listed in this manual and the *HP LaserJet Printer Family Paper Specifications Guide.* See “Tools and Suppliers” (page 42) for help in obtaining tools needed to perform these tests. TBD These suppliers need to be verified.

Basis Weight Field Test

The basis weight should be indicated on the ream label. If the label is not available, a simple field test can identify the basis weight of paper. The basis weight of paper is equal to the weight of 2000 sheets of paper, or 4 full reams. Weigh a full ream on a postal scale and then multiply that weight by 4. Or weigh 10 sheets of paper, divide that weight by 10, multiply by 2000, and then divide by 16.

Table 2-8. Determining Basis Weight of Paper

Amount	Formula
4 reams	weight = basis weight
1 ream	weight x4 = basis weight
10 sheets	(weight divided by 10) x 2000 and then divide by 16 = basis weight

Example:

10 sheets weigh 1.6 oz.

0.16 oz. x 2000 = 320 oz.

320 oz. ÷16 oz./lb = 20 lb paper

Paper Weight Equivalence Table

Use this table to determine approximate equivalent points in weight specifications other than U.S. bond weight. For example, to determine the equivalent of 20 lb U.S. bond weight paper in U.S. cover weight, locate the bond weight (in row 3, second column) and scan across the row to the cover weight (in the fourth column). The equivalent is 28 lb.

Table 2-9. Paper Weight Equivalence

	U.S. Post Card thick-ness (mm)	U.S. Bond Weight (lb)	U.S. Text/ Book Weight (lb)	U.S. Cover Weight (lb)	U.S. Bristol Weight (lb)	U.S. Index Weight (lb)	U.S. Tag Weight (lb)	Europe Metric Weight (g/m2)	Japan Metric Weight (g/m2)
1		16	41	22	27	33	37	60	60
2		17	43	24	29	35	39	64	64
3		20	50	28	34	42	46	75	75
4		21	54	30	36	44	49	80	80
5		22	56	31	38	46	51	81	81
6		24	60	33	41	50	55	90	90
7		27	68	37	45	55	61	100	100
8		28	70	39	49	58	65	105	105
9		32	80	44	55	67	74	120	120
10		34	86	47	58	71	79	128	128
11		36	90	50	62	75	83	135	135
12	.18	39	100	55	67	82	91	148	148
13	.19	42	107	58	72	87	97	157	157
14	.20	43	110	60	74	90	100	163	163
15	.23	47	119	65	80	97	108	176	176
16		53	134	74	90	110	122	199	199

NOTE: U.S. Post Card measurements are approximate. Use for reference only.

Metric Sizes

For metric size paper (A4), use the following method to determine basis weight.

Take 16 sheets of A4 paper and weigh them. One square meter of paper contains approximately 16 A4 size sheets. Compare this weight to the appropriate weight in “Paper Weight Equivalence” (page 39).

Caliper Field Test

Specification: The specified caliper differs with the type of media used. See “Operating Requirements” (page 25) for additional information.

Caliper can be measured in the field using a micrometer.

CAUTION: Never use the coarse adjustment end of the micrometer when measuring for caliper. The coarse adjustment will compress the paper fibers, resulting in an inaccurate reading. For example, if the fibers are compressed, 6 mil paper could measure as little as 3 mils. Always use the fine adjustment to measure caliper.

Using the fine adjustment, slide the micrometer along the edge of the paper and measure at one end. To double-check the accuracy of the reading, always measure again at the opposite end of the paper.

Paper Finish Field Test

Paper finish, or smoothness, can be accurately measured with a Sheffield meter. If this tool is not available, use a new U.S. dollar bill as a benchmark for comparing paper texture. A dollar bill has a finish of 350 Sheffields, which is 100 over specifications. if paper feels as rough as a dollar bill, it is recommended that users do not continually use this paper in the printer.

Moisture Content Field Test

Specification: Use paper with 4-6% moisture content.

A ream or sheet of paper may be measured with a moisture meter. In general, only evaluate the customer's storage environment when trying to determine if excess moisture or dryness is the cause of a problem with paper.

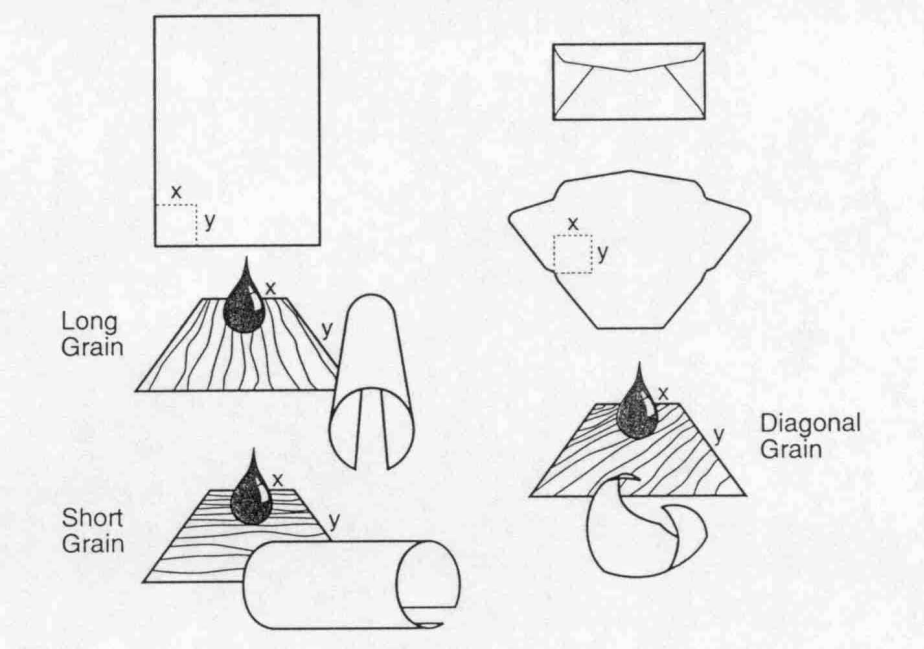
Grain Field Test

The grain direction is usually specified on the ream label (written out "long" or "short"). The paper dimensions listed on the label also indicate grain direction. For example, short grain letter size paper will read "11 x 8.5" and long grain will read "8.5 x 11."

If the grain direction is not included on the ream label, it can be determined by a simple wet test. Cut a small square from the corner of a sheet of paper, wet it, and observe the manner in which it curls.

Envelopes should have a diagonal grain, which gives them the best stability. To determine this, cut a square section from one corner of an envelope. Wet this section and observe the manner in which it curls. Two opposite corners should curl toward each other.

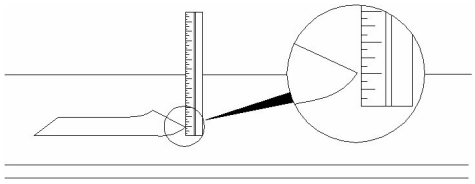
Figure 2-2 Long, Short, and Diagonal Grain Curl



Curl Field Test

To check for paper curl, place a single sheet of paper onto a flat surface and measure curl at the greatest deflection, holding a ruler perpendicular to the flat surface.

Figure 2-3 Measuring Curl



Cut Edge Condition Field Test

The condition of the cut edge can be easily observed with an eye loop. Under magnification, a good edge will appear even. A poorly cut edge will show fraying, jagged edges, compressed fibers, and other damage.

Furnish (Fiber Composition) Field Test

Specification: Use paper made form 100% chemical wood pulp and /or cotton fiber. Recycled paper made with no more than 5% groundwood is also acceptable.

Read the ream label to determine the fiber composition of the paper. Paper is usually specified as xerographic bond (suitable for copiers or laser printers) or cotton bond. Cotton bond paper of 25%, 50% or 100% will be indicated on a watermark. If paper is less than 25% cotton bond, the watermark will not indicate a percentage. A wood pulp test kit may also be used to test fiber composition.

Fusing Compatibility Field Test

Inspect the rollers for colored ink build-up from pre-printed logos or letterhead, and for toner build-up or spots. Inspect printed output for repetitive defects and smearing. If necessary, have users contact the forms vendor to ensure paper's fusing compatibility with HP LaserJet printers.

Tools and Suppliers

Hewlett-Packard neither warrants nor recommends a particular manufacturer, supplier, or tool. Products are subject to change and HP has no control over such changes. However, the following table of tools and their suppliers is provided for convenience.

Table 2-10. Tools and Suppliers

Tool	Part Number	Supplier Address
Paper Moisture Meter Single Sheet Clamp Probe	2RRDMP 2R43E	Mitchell Instrument 1570DDD Cheroke St. San Marcos, CA 92069-2433 (619)744-2690
Temperature / Humidity Meter	#3T331	Industrial Motor Service 2000 Albright Montgomery, IL 60538 (708) 892-9133 (Tom Fick)
Sheffield Tester: Precisionaire Column Sheffield Tester: Smoothcheck Gauge	TM 58-25-01 TM 58-25-02	TMI Testing Machines Inc. 400 Bayview Avenue Amityville, NY 11701 (516)842-5400
Wood Pulp Test Kit pH Test Kit	4280-2 4360-2	Shape Products 1127 57th Avenue Oakland, CA 94621 (800)444-0015
Resistivity Test Tool: Precision Current / Resistance Meter Resistivity Test Tool: Surface Resistivity Probe	 278 96117-1	Monroe Electronics 100 Housel Avenue PO Box 100 Lyndonville, NY 14098 (800) 821-6001

3 Printer Configuration

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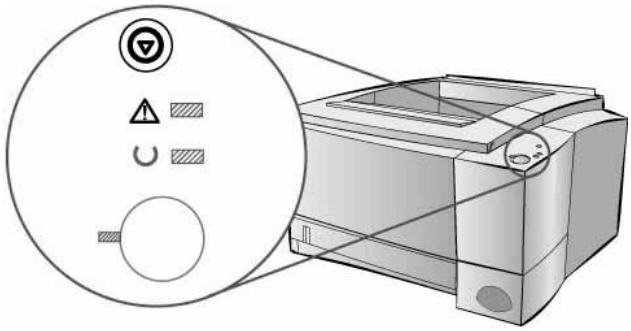
Using the Control Panel

As shown in figure 3-1, this printer's control panel has only two buttons: JOB CANCEL and GO. Pressing one of these buttons or a combination of the two does the following:

- Cancels print jobs.
- Resumes printing when the printer is paused.
- Prints a demo page or a self test/configuration page.
- Initiates a continuous self test.
- Performs a cold reset or an NVRAM init.
- Reveals secondary information (for example, LED messages).

Other printer configurations must be performed while in the service mode via PJL commands or using the LaserJet configuration utility. See "Service Mode" (page 49) for more information.

Figure 3-1 HP LaserJet 2100 Control Panel LEDs



Display LEDs

The control panel LEDs provide both status and error messages via distinct light patterns. See Chapter 6: Troubleshooting for more information.

Job Cancel Button

Press JOB CANCEL to cancel the current print job. The control panel LEDs will cycle while the print job is cleared from both the printer and the computer, and then return to ready. This might take some time, depending on the size of the print job.

- If JOB CANCEL is accidentally pushed, the job must be reprinted.
- If JOB CANCEL is pushed when the printer is idle, the top panel status lights will cycle and the printer will return to the ready state.

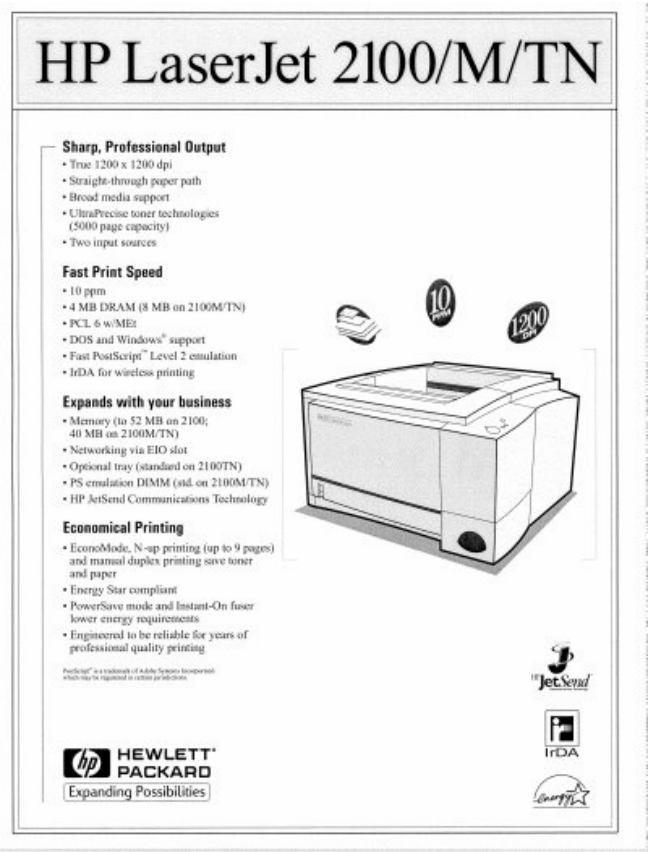
Go Button

- Press GO to resume printing when the printer is paused or when unprinted data is still in the printer.
- Press GO to clear some printer errors.

Printing Demo Page

To print the demo page, press the Go button when the printer is in the ready state.

Figure 3-2 HP LaserJet 2100 Demo Page

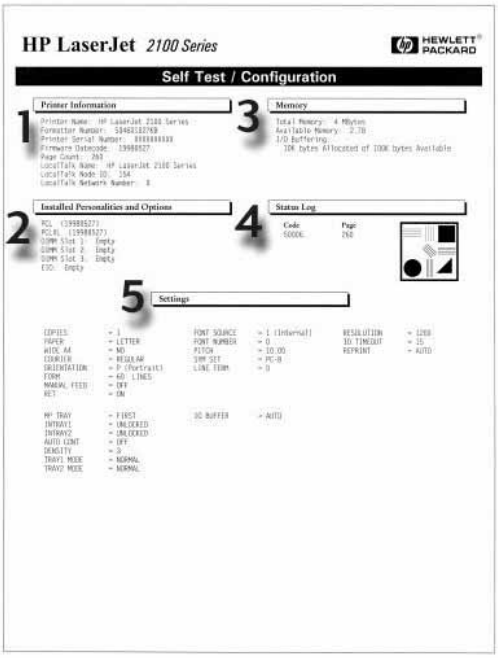

HP LaserJet 2100/M/TN
Sharp, Professional Output
• True 1200 x 1200 dpi
• Straight-through paper path
• Broad media support
• UltraPrecise toner technologies (5000 page capacity)
• Two input sources
Fast Print Speed
• 10 ppm
• 4 MB DRAM (8 MB on 2100M/TN)
• PCL 6 w/MEt
• DOS and Windows® support
• Fast PostScript™ Level 2 emulation
• IrDA for wireless printing
Expands with your business
• Memory (to 52 MB on 2100; 40 MB on 2100M/TN)
• Networking via EIO slot
• Optional tray (standard on 2100TN)
• PS emulation DIMM (std. on 2100M/TN)
• HP JetSend Communications Technology
Economical Printing
• EconoMode, N-up printing (up to 9 pages) and manual duplex printing save toner and paper
• Energy Star compliant
• PowerSave mode and Instant-On fuser lower energy requirements
• Engineered to be reliable for years of professional quality printing
10 ppm
1200 dpi
JetSend
IrDA
HEWLETT PACKARD
Expanding Possibilities

Printing Self-Test/Configuration Page

The configuration page lists many of the current settings and properties of the printer. To print the configuration page, press and release the GO and JOB CANCEL buttons simultaneously when the printer is ready. If an EIO card is installed, a JetDirect Configuration Page also prints (see figure 3-4).

Configuration Page Elements

Figure 3-3 HP LaserJet 2100 Self-Test/Configuration Page



1 **Printer Information** lists the name, formatter number, serial number, firmware datecode, page count, LocalTalk information (name, node ID, and network number), PostScript Level 2 emulation wait timeout, and HP JetSend address.

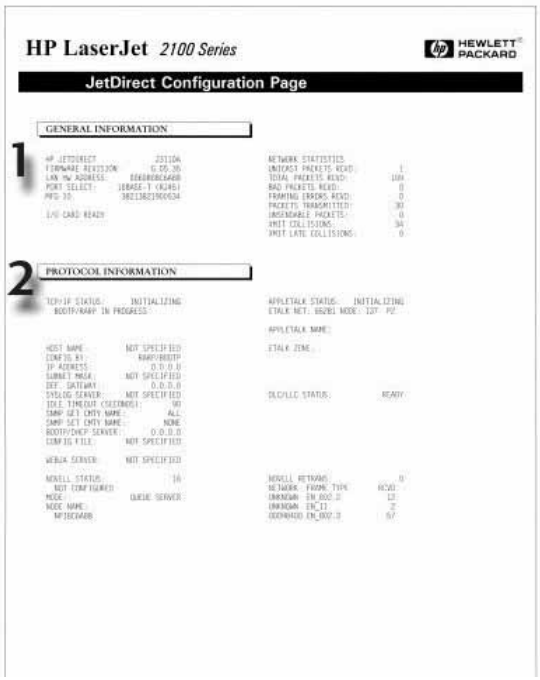
2 **Installed Personalities and Options** lists the installed printer languages (PCL, PCLXL, and PostScript Level 2 emulation) and the options installed in each of the three DIMM slots and the EIO slot.

3 **Memory** lists total memory, available memory, I/O buffering information, and resource saving information.

4 **Status Log** lists the PJL status code and the corresponding page count. (The status log only appears when errors have been registered.)

5 **Settings** lists settings for copies, paper, wide A4, courier, orientation, form, manual feed, Resolution Enhancement technology (REt), resolution, personality, I/O timeout, reprint, font (source, number, pitch, symbol set, and line term), PostScript Level 2 emulation error reporting, tray (multipurpose tray designation, tray locking, auto continue, density, and tray mode), and I/O buffer.

Figure 3-4 HP LaserJet 2100 JetDirect Configuration Page



1 **General Information** lists the HP JetDirect number, firmware revision, LAN hardware address, selected port, manufacturing ID, I/O card status, and network statistics (unicast packets, total packets, bad packets, framing errors received, packets transmitted, unsendable packets, transmit collisions, and transmit late collisions).

2 **Protocol Information** lists TCP/IP status and configuration, the HP Web JetAdmin server name, Novell NetWare status and configuration, AppleTalk status and configuration, and DLC/LLC status.

Continuous Self-Test

To initiate a continuous self-test, first turn the printer power off. After the power is off press and hold the GO button. Turn the printer power back on and continue to hold the GO button for 15 or more seconds (after 15 seconds all of the LEDs turn on). The continuous self-test begins once the GO button is released (anytime after 15 seconds). When the GO button is released, the LEDs cycle one after another. As the continous self-test pages print, the Ready LED blinks. The printer prints self-test/configuration pages until either the JOB CANCEL button is pressed or the printer power is cycled.

Engine Test

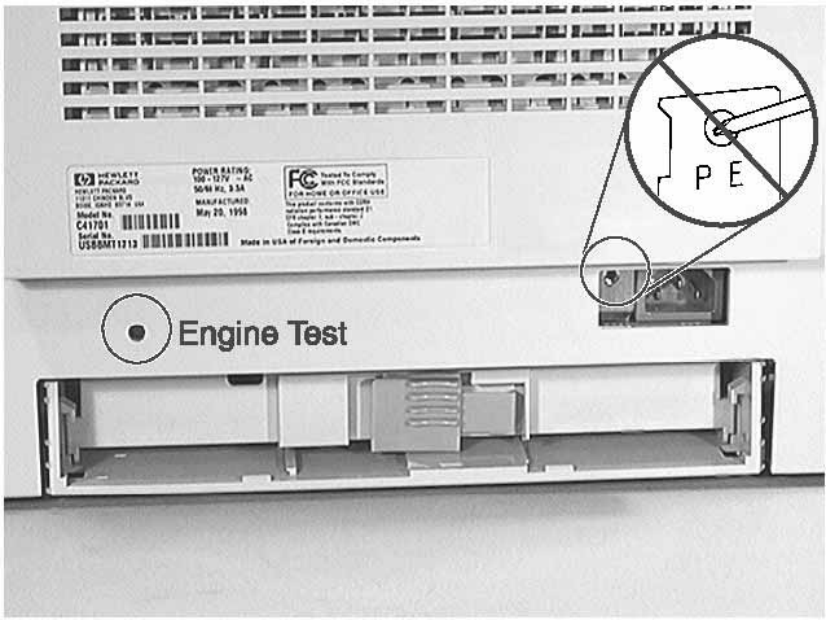
The engine test can be used to verify that the print engine is functioning correctly. The formatter PCB is completely bypassed during an engine test; therefore, this test is useful for isolating problems. The engine test prints a full page of horizontal lines across the entire printable area. The engine test page is also useful for checking registration.

To print an engine test page, use a long, non-conductive object to press the engine test button shown in figure 3-5. A single page is printed.

WARNING! Do not use an electrically conductive object to press the engine test button.

Do not insert any object into the opening next to the power cord socket as shown in figure 3-5. This is not the engine test button.

Figure 3-5 Engine Test Button



Service Mode

In Service Mode the following can be preformed:

- Print a Service Mode Self-Test.
- Verify and set the page count.
  See “Setting the Page Count” (page 51) for information.
- Set the Cold Reset Default.
  See “Setting the Cold Reset Default” (page 51) for information.
- Set the Demo Page=True/False
  Used to remove the demo page from the service mode self-test.
- Set the Diagnostic Functions On or Off.
  For software developers use only.

Accessing Service Mode

Use PJL commands to enter service mode and perform various service mode configurations. Many printer commands use the lowercase letter l (l) and the number one (1), or the uppercase letter O (O) and the number zero (0). These characters may not appear on the screen as shown here. Users must use the exact character and case specified for PCL printer commands. The following are elements of a typical printer command:

- Escape character (begins escape sequence)
- Parameterized character
- Group character
- Value field (contains both alpha and numeric characters)
- Termination character (uppercase)

Escape sequences may be combined into one escape sequence string. There are three important rules to follow when combining code:

1 The first two characters after the E_C character (the parameterized and group characters) must be the same in all of the commands to be combined.

2 When combining escape sequences, change the uppercase (termination) character in each individual escape sequence to lowercase.

3 The final character of the combined escape sequence must be uppercase.

Entering Escape Characters

Printer commands always begin with the escape character (E_C). The following table shows how the escape character can be entered from various DOS software applications.

DOS Software	Application Entry	What Appears
Lotus 1-2-3 and Symphony	Type \027	027
Microsoft Word for DOS	Hold down ALT and type 027 on the numeric keypad	<--
WordPerfect for DOS	Type <27>	<27>
MS-DOS Edit	Hold down CTRL-P, and press ESC	<--
MS-DOS Edlin	Hold down CTRL-V, andpress [	^[
DBASE	Type ?? CHR(27)+"command"	?? CHR(27)+" "

Table 3-1 shows how to use PJL commands to enter service mode and perform various service mode configurations.

.

Table 3-1. PJL Service Mode Commands

PJL Command	Description
E_C%-12345X@PJL	Start PJL job.
@PJL SET SERVICEMODE=HPBOISEID	Enter Service Mode
@PJL SET PAGES=0	Set page count [= xxxxx]
@PJL SET CRPAPER=LETTER	Sets cold reset page size [=Letter/A4]
@PJL SET SKIPDEMO=FALSE	Skips demo/PCL type page [=true/false]
@PJL SET DIAGNOSTICS-OFF	Sets diagnostics [=OFF/ON] (for ISV use)
@PJL SET SERVICEMODE=EXIT	Exits Service Mode
DEFAULT PAPER=LETTER	Selects user paper size default
@PJL RESET	Performs PJL reset
E_C%-12345X	Exits PJL mode
E_CZ	Prints self test/configuration page
E_CE	Resets the printer

Setting the Page Count

The page count is stored in the printer's non-volatile memory (NVRAM). If it is necessary to replace the formatter PCB, the page count should be reset to the printer's original page count to reflect the age of the print engine. Before removing the old formatter PCB, print a self-test/configuration page to verify the current page count of the printer, if possible. See "Printing Self-Test/Configuration Page" (page 46) for information.

Table 3-2. Setting the Page Count Via PJL Service Mode Commands

PJL Command	Description
E_C%-12345X@PJL	Start PJL job.
@PJL SET SERVICEMODE=HPBOISEID	Enter Service Mode
@PJL SET PAGES=0	Set page count [= xxxxx]
@PJL SET SERVICEMODE=EXIT	Exits Service Mode
@PJL RESET	Performs PJL reset
E_C%-12345X	Exits PJL mode
E_CZ	Prints self test/configuration page
E_CE	Resets the printer

Setting the Cold Reset Default

The customization variable will determine the default paper size after a cold reset. This is set to A4/Letter at the manufacturer. This variable may need to be reset when replacing the formatter.

Table 3-3. Setting the Cold Reset Default Via PJL Service Mode Commands

PJL Command	Description
E_C%-12345X@PJL	Start PJL job.
@PJL SET SERVICEMODE=HPBOISEID	Enter Service Mode
@PJL SET CRPAPER=LETTER	Sets cold reset page size [=Letter/A4]
@PJL SET SERVICEMODE=EXIT	Exits Service Mode
@PJL RESET	Performs PJL reset
E_C%-12345X	Exits PJL mode
E_CZ	Prints self test/configuration page
E_CE	Resets the printer

Resetting the Printer

Cold Reset

To perform a cold reset, turn the printer power off, then press and hold the JOB CANCEL button. Turn the printer power back on and after all the LEDs come on release the JOB CANCEL button.

A cold reset changes most system parameters in NVRAM to the factory defaults. The JOB CANCEL button must be released within 20 seconds after all of the LEDs come on; otherwise, an NVRAM initialization is performed instead of a cold reset.

NVRAM Initialization

An NVRAM initialization reinitializes NVRAM and sets all system parameters to the factory defaults. To perform an NVRAM initialization, turn the printer power off, then press and hold the JOB CANCEL button. Turn the printer power back on and continue to hold the JOB CANCEL button for 20 or more seconds after all of the LEDs come on.

The NVRAM initialization starts once the JOB CANCEL button is released (anytime after 20 seconds). The control panel cycles the LEDs from front to back until the NVRAM initialization is complete.

Remote Control Panel

The Remote Control Panel (RCP) lets users view and modify the printer's default settings from the computer. This is useful if DOS software applications are running that do not support some or all of the needed printer features.

Once the DOS RCP is installed, start it with the following command:

At the DOS prompt, switch to the drive and directory where the RCP is located (by default C:\HPLJUTIL), type RCP and press ENTER.

Installing the Remote Control Panel

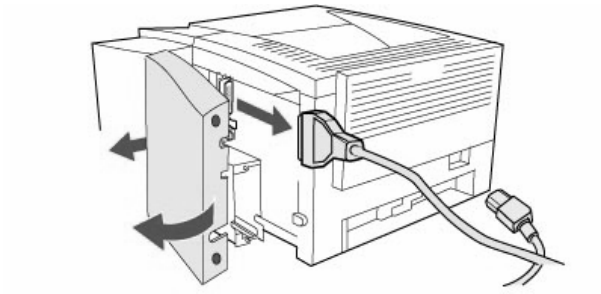
The DOS Remote Control Panel may already be installed. If it is not, to install the DOS Remote Control Panel, follow these steps:

1. Be sure that the HP LaserJet printer and cables are set up and connected to the PC according to the instructions in the *HP LaserJet 2100 Printer User Guide*.
2. Make sure that the printer is plugged in and ready to print.
3. Insert the HP LaserJet DOS Utilities disk into the flexible disk drive (usually A: or B:).
4. At the DOS prompt, switch to the drive where the HP LaserJet DOS Utilities disk is located (for example, A:). If installing from the CD-ROM, switch to the drive and directory where the DOS Utilities are located (for example, D:\ENGLISH\DOS).
5. Type `INSTALL` and press ENTER.
6. Follow the instructions on the screen.

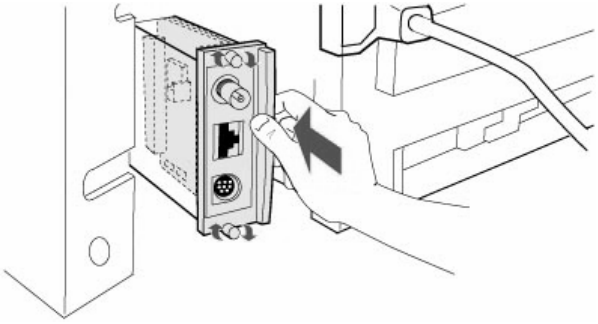
Once the DOS utilities are installed, run the installation program again with the following command: At the DOS prompt, switch to the drive and directory where the the utilities are located (by default C:\HPLJUTIL), type `INSTALL` and press ENTER.

Installing an HP JetDirect EIO Card

1 Turn the printer off, and disconnect the power cord.



2 Open the interface cable door by pressing on the release tabs. Disconnect all interface cables.



3 Locate the EIO Slot. Firmly insert the HP JetDirect EIO card into the EIO slot. Twist in the retaining screws.

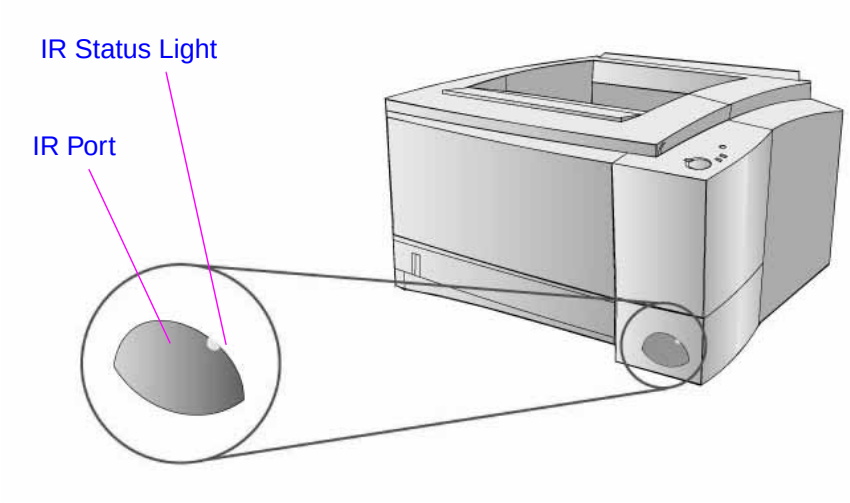
4 Attach the appropriate network cable to the EIO card.

5 Reinstall the interface cable(s) power cord. Reinstall the interface cable door. Turn the printer on.

NOTE: Print a PCL configuration page to check that the HP JetDirect EIO card appears as an installed option.

IR Printing

The infrared (IR) port is located on the lower right corner of the printer. This port is compliant with the specifications determined by the Infrared Data Association (IrDA). On the right side of the IR port is a status light that indicates when the port is active. The IR port transmits data at speeds of up to 4 MB per second. When the IR connection is established, the IR status light comes on. If the connection is broken or when the print job is complete, the IR status light goes off.



The following is required to use the IR port:

- A computer or Personal Digital Assistant (PDA) equipped with an IrDA-compliant IR port.
- An infrared port driver that allows printing from the computer to the printer using the IR port and the IrDA communication protocol.
- A printer driver to generate data that the printer can print.

4 Printer Maintenance

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Service Check Points

Periodic replacement parts are the parts that should be changed at regular intervals. Failure of these parts can seriously affect the printer's performance. These parts should be replaced during a regular service visit closest to the end of the part's expected life.

The following parts should be replaced after approximately 150,000 pages of use:

- Fusing Assembly
- Transfer Roller
- Separation Pad
- Pickup Rollers (Tray 1, Tray 2, and Tray 3)
- Output Feed Rollers (Upper and Lower)
- Transport Belts and Rollers

See Chapter 7: Removal and Replacement for procedures on removing and replacing these parts.

Variables such as media, environment, and usage can cause premature wear of these parts. See Chapter 2: Operating Requirements for information on suitable media, environment, and usage conditions.

Cleaning the Printer

To maintain print quality, follow the general cleaning procedure every time the toner cartridge is changed or whenever print quality problems occur. Keep the printer as free from dust and debris as possible.

General Cleaning

WARNING! Turn the printer off and unplug the power cable before cleaning the printer.

CAUTION: To prevent damage, do not expose the toner cartridge to light for more than a few minutes. Place a piece of paper over the top of the toner cartridge to shield it while it is out of the printer.

- Clean the outside of the printer with a lightly water-dampened cloth.
- Clean the inside of the printer with a dry, lint-free cloth:
  - Transfer Roller
  - Tray 1 Pickup Roller
  - Tray 1 Separation Pad
  - Registration Shutter
  - Transfer Guide Unit
  - Feed Belt/Feed Guide Unit
  - Fusing Assembly Entrance Guide

Do not use ammonia-based cleaners on or around the printer. While cleaning the printer, be careful not to touch the transfer roller's sponge (located underneath the toner cartridge). Skin oils on the transfer roller's sponge can cause print quality problems.

Internal Cleaning

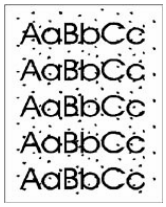
During the printing process, paper, toner and dust particles can accumulate inside the printer. Over time, this buildup can cause print quality problems such as toner specks or smearing. This printer has two internal cleaning modes that can correct and prevent these types of problems.

Engine Cleaning

NOTE: For best results, use a transparency during this process. If a transparency is not available, use copier grade paper and not bond or rough paper.

This process uses a transparency from Tray 1 to remove dust and toner from the paper path. Use this process if toner specks or dots appear on printouts. This process will provide a blank page which should be discarded.

Figure 4-1 Print Sample



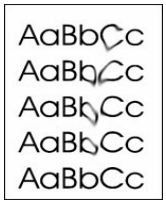
To Start Engine Cleaning

1. Make sure the printer is turned on and in the ready state. Load a transparency in Tray 1.
2. Press and hold the GO and JOB CANCEL buttons until all lights flash. This will take about 10 seconds. Release the buttons when the lights flash.
3. Press the GO button.
4. Discard the blank page produced from the engine cleaning process.

Toner Cartridge Cleaning

This process cleans the photosensitive drum inside the toner cartridge. Use this process if blurred, faded or smeared printouts occur. This process takes about 10 minutes.

Figure 4-2 Engine Cleaning



NOTE: Make sure the toner cartridge is not empty when using this process. This process consumes toner and if used often can reduce toner cartridge life. A nearly empty toner cartridge might also cause print defects.

To Start Toner Cartridge Cleaning

1. Make sure the printer is turned on and in the ready state.
2. Press and hold the GO and JOB CANCEL buttons until all lights flash. This will take about 10 seconds. Release the buttons when the lights flash.
3. Press the JOB CANCEL button.

To stop the toner cartridge cleaning process, turn the printer off.

Toner Cartridge Information

Toner cartridges contain components which are sensitive to light, temperature, and humidity. Make sure the user follows the recommendations in this section to ensure the highest quality and longest life of HP toner cartridges.

Storage

The toner cartridge should not be removed from its package until installation. The shelf life of a cartridge in an unopened package is approximately 2.5 years. The shelf life of a cartridge in an opened package is approximately 6 months. The expiration date of the toner cartridge is stamped on the cartridge box.

If cartridges are stored, the storage environment should meet the conditions listed in the following table:

Table 4-1. Storing Toner Cartridges

Category	Temperature	Humidity
Operating	10 to 32.5 degrees C (50 to 90.5 degrees F)	35 to 85% RH
Storage	-20 to 40 degrees C (-4 to 104 degrees F)	15 to 90% RH

If the toner cartridge must be removed from the printer, always store the cartridge as follows:

- Inside the protective bag in which it was originally packaged.
- In a dark cabinet, away from direct sunlight.
- Correct side up and in a horizontal position (not standing on end).
- In a temperature listed in the table above.
- Away from ammonia or other organic solvent fumes.

CAUTION: Never ship the printer with a toner cartridge installed. Excessive vibration during shipping can cause toner to leak, contaminating the printer.

Never expose the toner cartridge to direct sunlight, or to room light for more than a few minutes. Bright light and direct sunlight can permanently damage a toner cartridge.

Handling Instructions

- Before installing a cartridge, evenly distribute the toner. See “Redistributing the Toner” (page 66) for instructions.
- Do not touch the surface of the photosensitive drum in the cartridge. Protect the drum from light and contamination.
- Do not expose the cartridge to unnecessary vibrations or shock.
- Do not expose the photosensitive drum to strong light. Blurred areas on the page might indicate that the drum has been exposed to light for too long. This causes permanent damage to the photosensitive drum. Replace the cartridge.
- Never manually rotate the drum, especially in the reverse direction; it can cause internal damage and toner spills.

Cleaning Spilled Toner

Defective toner cartridges can develop leaks. In addition, after a paper jam has occured, some toner might remain on the rollers and guides inside the printer. The pages that print immediately after the jam might pick up this toner.

To clean skin and clothing if toner spills, remove as much toner as possible with dry tissue, then wash with cold water. Hot water causes toner to permanently set into clothing.

Refilled Toner Cartridges

HP Policy on Non-HP Toner Cartridges

Hewlett-Packard Company cannot recommend use of non-HP toner cartridges, either new, refilled, or remanufactured. Because they are not HP products, HP cannot influence their design or control their quality.

While Hewlett-Packard Company does not prohibit the use of refilled toner cartridges during the warranty period or while under a maintenance contract, we do not recommend their use for the following reasons:

- Hewlett-Packard has no ability to ensure that a refilled toner cartridge functions at the high level or reliability of a new HP toner cartridge. Hewlett-Packard also cannot predict the long term effect of the different toner formulations found in refilled cartridges.
- Hewlett-Packard has no control over the print quality of a refilled toner cartridge. The print quality of HP toner cartridges influences the customer's perception of the printer.
- Repairs resulting from the use of refilled toner cartridges may not be covered under the HP warranty or maintenance contract.

Recycling Toner Cartridges

In many countries, this product's printing supplies (e.g., toner cartridge, drum, fuser) can be returned to HP through the HP Planet Partners Printing Supplies Environmental Program. An easy-to-use takeback component of the program is available in over 20 countries. Multi-lingual program information and instructions are included in every new HP LaserJet Toner Cartridge and Consumables box.

For more information, call (1) (800) (340-2445) (U.S. Only) or visit the HP LaserJet Supplies website:

U.S.:http://www.hp.com/ljsupplies/environment_main.html

Europe: http://www.hp.com/pays/eur_supplies/english/planetpartners

Non-US customers should call the local HP Sales and Service Office for further information regarding availability of the HP Planet Partners Printing Supplies Environmental Program.

Toner Cartridge Weights

The weight of a toner cartridge when full and empty is as follows:

Full:	1130 grams (39.86 oz)
Empty:	925 grams (32.63 oz)

Toner Cartridge Life Expectancy

The life of the toner cartridge depends on the amount of toner used in each print job. When printing text at 5% coverage, an HP LaserJet 2100 toner cartridge lasts an average of 5,000 pages. This assumes the default print density setting and EconoMode is off. (These are the default settings.)

Saving Toner with EconoMode

Toner cartridge usage can be extended by using the printer's EconoMode feature. EconoMode can be turned on or off through the driver or HP LaserJet Configuration Utility.

- EconoMode functions in portrait orientation only.
- EconMode does not function at 1200 dpi.
- Some software applications might refer to EconoMode as "draft mode."

Redistributing the Toner

When toner is low, faded or light areas may appear on a printed page. To temporarily improve print quality, redistribute the toner. The cartridge will need to be replaced soon. To redistribute toner:

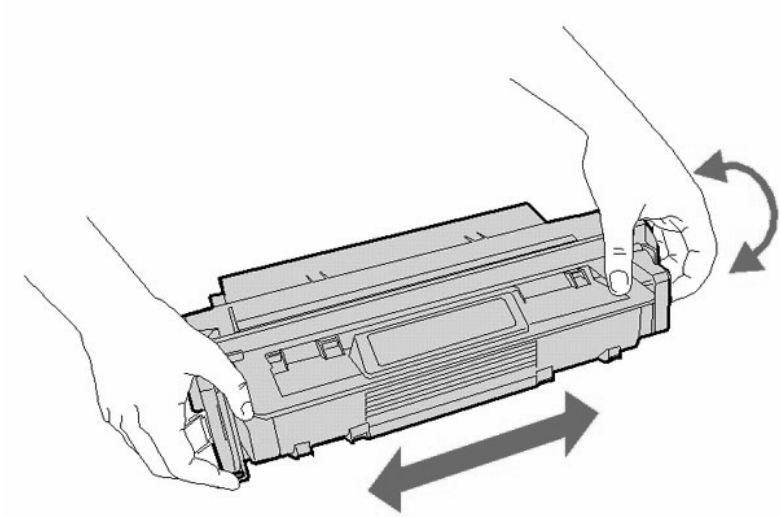
WARNING! Avoid reaching too far into the printer. The adjacent fusing area may be hot.

1 Remove the toner cartridge from the printer.

2 Rotate the toner cartridge and gently shake from side to side to redistribute the toner. (Do not tip the cartridge on end, or it might leak.)

If toner gets on clothing, wipe it off with a dry cloth and wash clothing in cold water. (Hot water sets toner into fabric.)

CAUTION: To prevent damage, do not expose the toner cartridge to light for more than a few minutes.



5 Functional Overview

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Sequence of Operation

The formatter system and the Engine Controller Assembly system share information during printer operation. The Engine Controller Assembly-to-formatter connector forms a link which operates as a serial data bus. This lets printer status, command information, and dot-image data to be passed between the two systems. The events described in the table below and shown in “Timing Diagram” (page 70) take place during normal printer operation.

Table 5-1. Print Period Descriptions (see “Timing Diagram” (page 70))

Period	Timing	Purpose
WAIT	From the time power is switched on to the end of the main motor’s initial rotation.	Clears the drum surface potential and cleans the Transfer Roller. Also detects whether or not the toner cartridge is installed.
Standby (STBY)	From the end of the WAIT period until the input of the PRINT signal from the Formatter. OR: From the end of the Last Rotation period until either the input of the PRINT signal from the Formatter or the power is switched off.	Maintains the printer in a ready state.
Initial Rotation (INTR)	From the input of the PRINT signal from the Formatter until the paper reaches the top-of-page sensor.	Stabilizes the sensitivity of the photosensitive drum in preparation for printing.
PRINT	From the end of the INTR period until 2 seconds after the top-of-page sensor detects the trailing edge of the paper.	Forms images on the photosensitive drum based on the /VDO signal from the Formatter and transfers the image to the paper.
Last Rotation (LSTR)	From the completion of printing until the main motor stops rotating. Returns to the INTR period if the Formatter sends another PRINT signal. Otherwise, returns to the STBY period.	Delivers the last sheet of paper. Also cleans the Transfer Roller.

Power On Sequence

The sequence from power on until the printer enters the STBY period is as follows:

1 Power on.

2 CPU initialization.

3 Video interface communication start.

4 Fusing heater drive.

5 Main motor and fan drive.
Determines the paper detection status of each sensor in the printer immediately before driving the main motor, and assesses a paper jam if residual paper is detected.

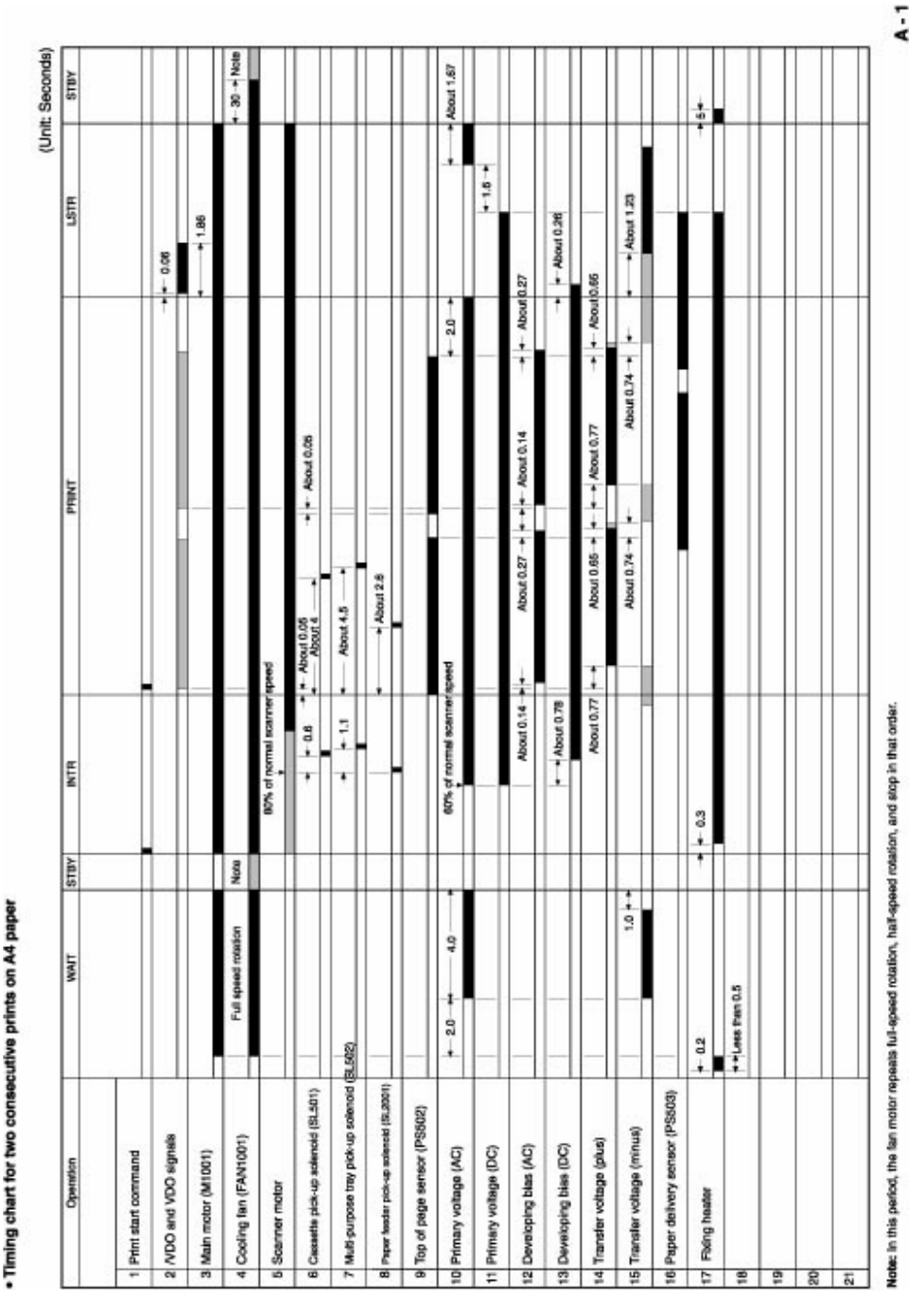
6 High voltage control.
Determines whether or not the toner cartridge is installed, and if so cleans the transfer charging roller after the primary charging AC bias is turned on.

7 Residual paper check.
After starting the main motor, checks again for residual paper in the printer. If it finds paper, the printer assesses a paper jam or automatically delivers the residual paper according to the situation.

8 Failure/abnormality check.
In the steps above, the printer detects any door open condition, fan motor failure, or fusing assembly failure when they occur.

Timing Diagram

Figure 5-1 Timing Diagram



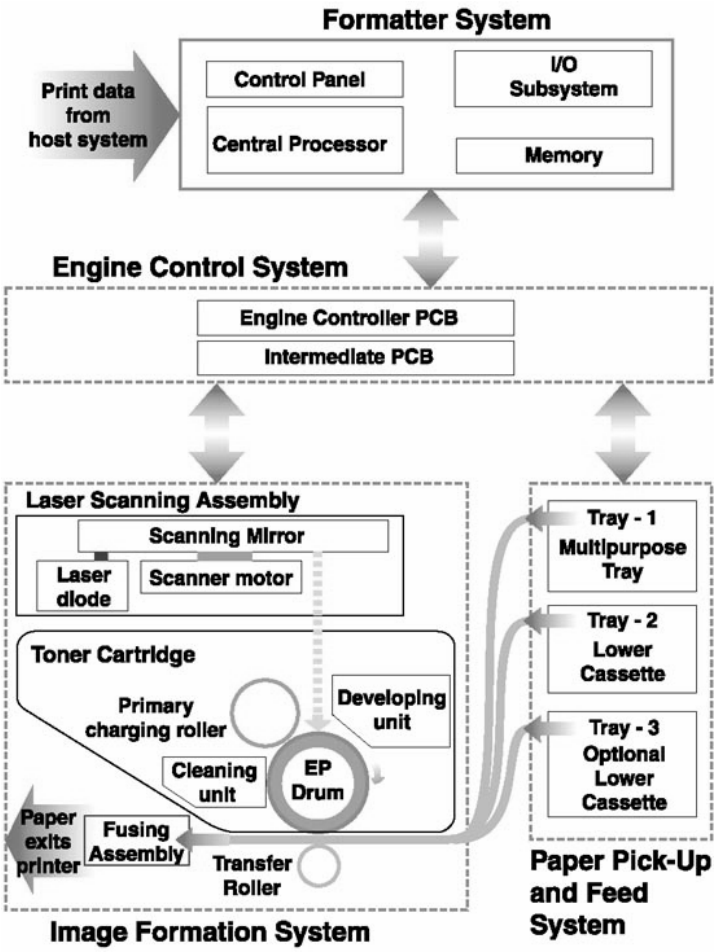
Printer Functionality and Operation

There are four major systems that make up the HP LaserJet 2100 printer and allow it to operate. Each system works independently to accomplish its task, but must be coordinated with the other systems to successfully produce a printed page. Understanding these systems, their function, and how they interact with each other is the key to troubleshooting any problem. Detailed information regarding the troubleshooting of the HP LaserJet 2100 is included in Chapter 6: Troubleshooting.

The HP LaserJet 2100 printer's four major systems are as follows:

- "Formatter System" (page 72) - Receives print data from the host, processes the image, and transfers it to the Engine Control System. The Formatter System also provides the interface between the user and the printer (Control Panel).
- "Engine Control System" (page 77) - Monitors and controls all of the printer's mechanical and electrical subsystems. It is the center of the printer's operation.
- "Image Formation System" (page 80) - Produces the actual physical image on the page.
- "Paper Pick and Feed System" (page 87) - Moves paper or other print media through the printer from one of the selected input trays (Tray 1, 2, or 3) to the selected output bin (top or rear).

Figure 5-2 Printer Functionality Divided into Systems



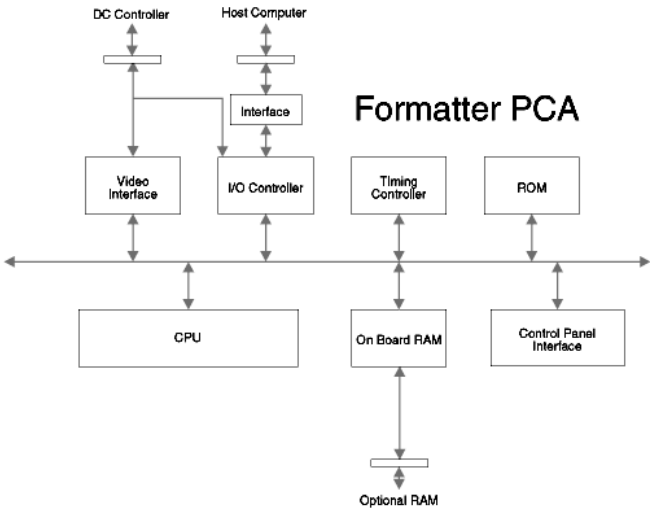
Formatter System

The Formatter System is responsible for the following:

- Receiving and processing data from the various printer interfaces.
- Monitoring control panel input and relaying printer status information (through the control panel and the I/O).
- Developing and coordinating data placement and timing with the print engine.
- Storing font information and macros.
- Communicating with the host computer.

The Formatter receives data from the I/O and converts it into a dot image. The image orientation (portrait or landscape) and the font type are both selected. When the scan buffer is full or when a Form Feed command is received, the Formatter sends a PRINT signal to the Engine Controller Assembly. The Engine Controller Assembly synchronizes the Image Formation System with the Paper Feed System, and signals the Formatter to send the print image data. The Formatter sends the print image data (dots) in the form of a VIDEO signal and the printing process begins.

Figure 5-3 Formatter System Block Diagram



Formatter Hardware

The formatter system contains the following:

- **CPU**. 66 MHz Intel 80960JD with a 33 MHz bus.
- **Read Only Memory (ROM)**. Stores the dot patterns of internal character sets (fonts) in addition to storing microprocessor control programs.
- **Random Access Memory (RAM)**. Stores printing and font information received from the host system, and can also serve to temporarily store a full page of print image data before the data is sent to the print engine. Note that adding memory will not increase I/O buffer space or cause the printer to print more pages per minute.
- **Non-Volatile Memory (NVRAM)**. Stores information about the I/O and print environment configuration. The printer keeps the contents of NVRAM when the power is turned off or disconnected. (As in other HP LaserJet printers, downloaded fonts and macros are saved in conventional RAM and are lost when power is turned off.)
- **Interfaces**
  - **Parallel Interface**. Receives incoming ASCII data through its IEEE1284 B interface connector. The IEEE1284 B interface provides high-speed, two-way communication between the printer and the host, letting the user change printer settings and monitor the printer's status from the host computer.
  - **LocalTalk I/O**. Implements the AppleTalk networking protocol through the LocalTalk hardware. The LocalTalk network cable (HP P/N 92215N) is connected through an 8-pin DIN connector on the printer's I/O panel.
  - **EIO**. PCI-based Enhanced Input/Output (EIO) slots support a wide range of print servers, memory, or other add-on devices. HP JetDirect EIO cards provide high-speed communication for network printing over Ethernet, Ethernet and LocalTalk, Token Ring, or Fast Ethernet networks.

Formatter Subsystems

Resolution Enhancement technology (REt - 600 dpi only)

- Contains circuitry for Resolution Enhancement technology (REt), which modifies the standard video dot data on its way to the Engine Controller Assembly to produce smoothed black-to-white boundaries. The default is On.

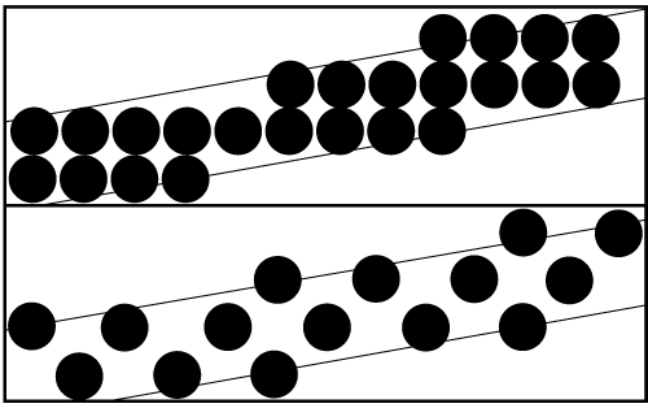
Print Density Adjustment

- Affects the line width (boldness) of the print image. This is accomplished by varying the developer DC bias, which controls the amount of toner applied to the photosensitive drum. Settings range from 1 (lightest) to 5 (darkest). The default is 3.

EconoMode (600 dpi only)

- Uses approximately 50% less toner than standard mode printing by reducing the dot density. Users can adjust EconoMode, which can also be thought of as draft mode, through software applications. The default setting is Off. EconoMode does not affect print speed or memory usage.

Figure 5-4 EconoMode Printing Versus Standard Mode Printing



Memory Management

This printer uses various methods to conserve and make the most of available memory. Several of these methods are explained below.

Memory Enhancement technology (MEt)

MEt doubles the printer's standard memory through a variety of font and data compression methods. MEt also automatically compresses fonts for desktop publishing applications. MEt is only available in PCL and XL modes; it is not functional when printing in PostScript mode. When printing graphics, MEt analyzes each page as it is being printed and automatically applies a variety of methods to print the complete page at the correct resolution.

Image Adapt

Image Adapt uses a compression technique to allow printing of full-page graphics using the printer's base memory. The available settings are Auto, On, and Off. The default is Auto.

If Image Adapt is used some data may be lost. To see if there has been some loss of graphic detail, print a self test page and check the Image Adapt Used line in the Printer Information section. If the printer invoked Image Adapt since the last time the self test was printed (or the last time the printer was turned off and on), that line reads “Image Adapt Used: Yes.”

Page Protect

A page's complexity (rules, complex graphics, or dense text) may exceed the printer's ability to create the page image fast enough to keep pace with the engine's printing process. If a page is too complex, it may print in parts (for example, the top half of data on one page and the bottom half on the next page). Some print data loss is likely in these instances, and the printer's Error light flashes.

Page Protect allows the Formatter to create the entire page image in memory before moving the paper through the printer. This process ensures that the entire page is printed. The default is off, which provides the best performance. Page Protect should only be enabled when necessary.

Printer Job Language (PJL) Overview

Printer Job Language (PJL) is an integral part of the configuration, in addition to the standard Printer Command Language (PCL). PJL allows the printer to perform functions such as:

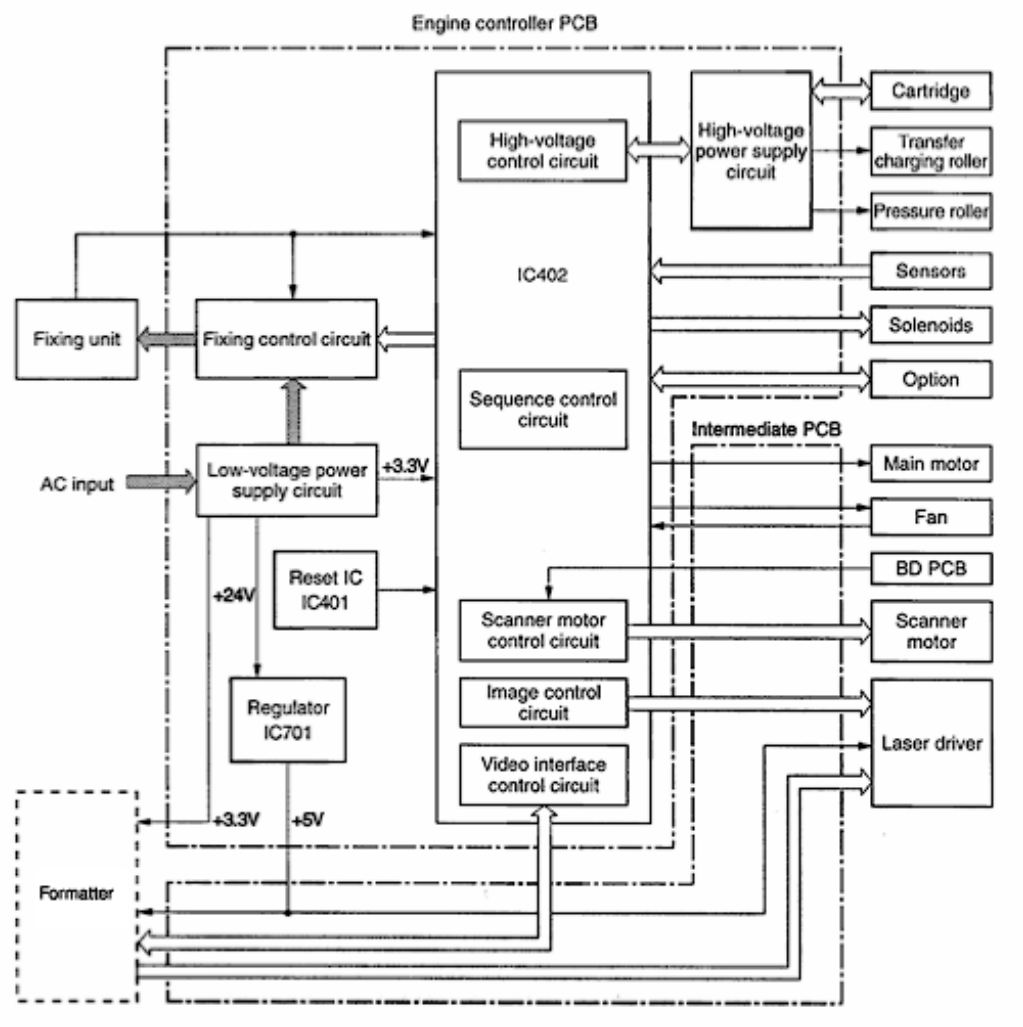
- **Two-way communication** with the host computer through an IEEE1284 B interface connection. The printer can tell the host such things as the control panel settings and allow the control panel settings to be set from the host.
- **Dynamic I/O switching** allows the printer to be configured with a host on each I/O. The printer can receive data from more than one I/O simultaneously until the buffer is full. This can occur even when the printer is offline.
- **Context-sensitive switching** allows the printer to automatically recognize the personalities (PostScript or PCL) of each host and configure itself to serve that personality.
- **Isolating print environment settings** from one print job to the next. For example, if a print job is sent to the printer in landscape mode, subsequent print jobs only print in landscape if they are formatted for landscape printing.

For more information, see the *Software Technical Reference Documentation* (Part Number 5021-0377). The complete PJL Status Code listing is contained in the appendix of the *Printer Job Language Technical Reference*. Also see HP's web site at www.hp.com.

Engine Control System

The engine control system shown in figure 5-5 consists of the Engine Controller Assembly and the Intermediate PCB. The Engine Controller Assembly coordinates all print engine activities.

Figure 5-5 Engine Control System



Specifically, the Engine Control System directly controls the following subsystems contained on the Engine Controller Assembly:

- Laser Scanner Control
- Paper Feed Control
- Microswitch Control
- Motor Control
- Fusing Assembly Control
- Power Supply and Control

NOTE: The Intermediate PCB is only a connection point to the Engine Controller Assembly. Before replacing the Engine Controller Assembly, make sure that the Intermediate PCB is not damaged and that the connections are correct.

Laser Scanner Control

Based on information received from the Engine Controller Assembly, the formatter sends a signal directly to modulate the laser diode on and off. The modulated laser beam strikes the surface of a rotating scanning mirror, then a focusing lens directs the beam onto the photosensitive drum.

The printing system synchronizes the process by continuously monitoring the beam detect signal.

Paper Feed Control

The Engine Controller Assembly controls paper motion by continuously monitoring the various paper sensor levers, and coordinating the timing with the other print processes and systems. See “Paper Pick and Feed System” (page 87) for more information.

Microswitch Control

The Engine Controller Assembly controls the following microswitches and reports any errors to the Formatter:

- **Top door and toner cartridge (SW1701)**. Activated if the top door is open. The toner cartridge is detected electronically.
- **Engine test (SW701)**. Activated manually through an access hole on the rear of the printer. This switch causes the print engine to perform a self test diagnostic, bypassing the formatter. See “Engine Test” (page 105).

Motor Control

The Engine Controller Assembly controls the following motors and reports any failures to the formatter. See “Sequence of Operation” (page 68) for more information on timing periods.

- **Main motor**. Rotates during Interim period (following initial power on), Print, and Last Rotation, or when the top cover is opened or closed.
- **Scanner motor**. Operates during the Interim period and the Print period.
- **Fan motor**. Rotates at full speed while the main motor is rotating and continues rotating for 30 seconds after the main motor stops. Rotates at full speed, half speed, and then stops during power on and the Standby period.

Fusing Assembly Control

The fusing assembly's film contains a heater. The Engine Controller Assembly controls the fusing heater during the following temperature modes. See "Sequence of Operation" (page 68) for more information on print period descriptions.

- **Initial**
- **Print**
- **Between-Page**
- **Postprint**

The Engine Controller Assembly maintains a temperature of about 195 degrees Celsius (383 degrees Fahrenheit) during print temperature mode. If the fusing system overheats (about 220 degrees Celsius; 428 degrees Fahrenheit), a relay (RL301) opens the power circuit to the fusing heater, causing a Fuser Error message. If the fusing system exceeds about 230 degrees Celsius (446 degrees Fahrenheit), the thermal fuse (FU1131) melts, cutting off power to the fuser assembly. The Engine Controller Assembly monitors the fusing heater temperature via a thermistor (TH701).

Power Supply and Control

- AC power is supplied to the low-voltage power supply circuit when the power switch is turned on. This circuit supplies DC voltage (+24V, +5V, +3.3V) to the Main Motor, Laser Scanner Unit, Interlock Switch, Video Controller, Solenoids, Paper Feeder, High-Voltage Power Supply, and Formatter.
- Opening the top cover interrupts the DC voltage supplied to the high-voltage power supply circuit.
- The low-voltage power supply circuit contains an overcurrent/overvoltage protection circuit that automatically turns off the output voltage when an overcurrent condition occurs because of a short or abnormal voltage on the load side.
- The protection circuit automatically resets after the input power is turned off then on. The low-voltage power supply circuit also contains a fuse that shuts off the power supply to the circuit when overcurrent conditions occur. See "Engine Control System" (page 77) for more information.

In response to the Engine Controller Assembly, the high-voltage power supply circuit (see figure 5-5) supplies DC and AC voltage to the various parts of the Image Formation System.

Image Formation System

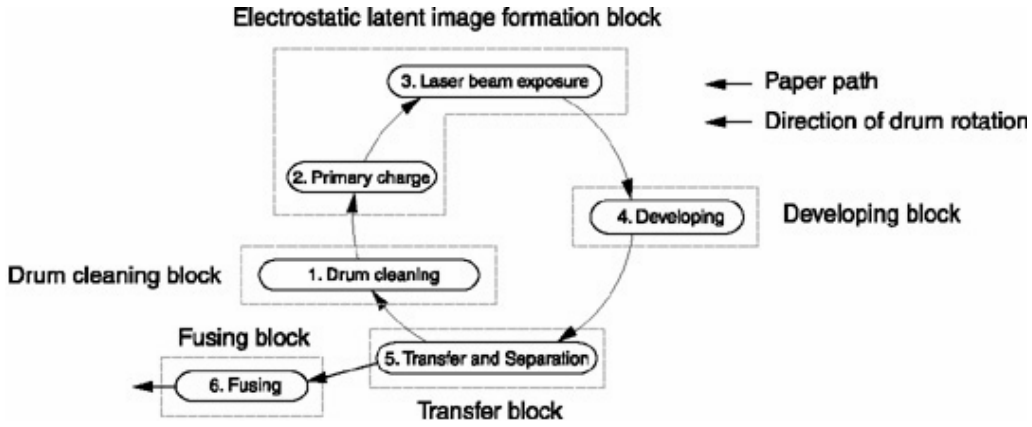
The image formation process consists of six stages:

1. Drum Cleaning	4. Developing
2. Primary Charge	5. Transfer and Separation
3. Laser Beam Exposure	6. Fusing

When the Formatter sends a print command to the Engine Controller Assembly, it in turn drives the main motor to rotate the photosensitive drum, primary charging roller, developing cylinder, and transfer charging roller. The primary charging roller uniformly applies negative charges to the surface of the photosensitive drum. To form a latent electrostatic image on the drum, its surface is then exposed to the laser beam.

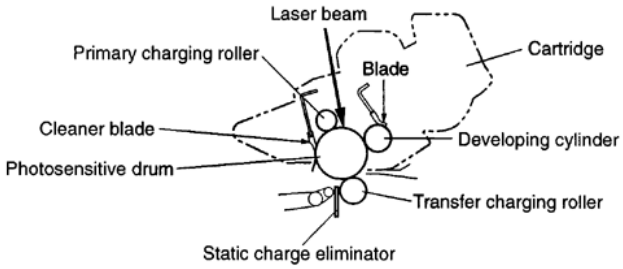
Toner on the developing cylinder changes the latent electrostatic image on the drum's surface to a visible image, and then the transfer charging roller transfers the image to the paper. The cleaning blade scrapes residual toner from the surface of the photosensitive drum. The primary charging roller again uniformly applies negative charges to the drum's surface in preparation for the next latent electrostatic image.

Figure 5-6 Image Formation System Block Diagram



Toner Cartridge

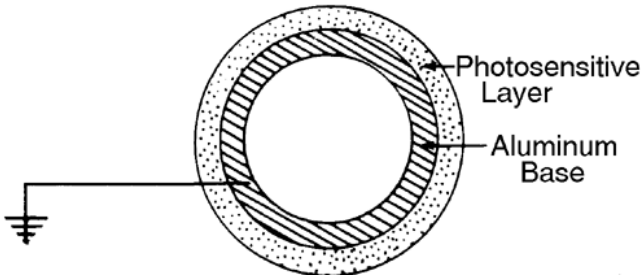
Figure 5-7 Toner Cartridge Components



The toner cartridge contains the cleaning, conditioning, and developing stages of the image formation process. These components of the image formation system that wear, degrade, or are consumed are built into the replaceable toner cartridge (see figure 5-7). This eliminates the need for a service call when replacement is required.

Photosensitive Drum

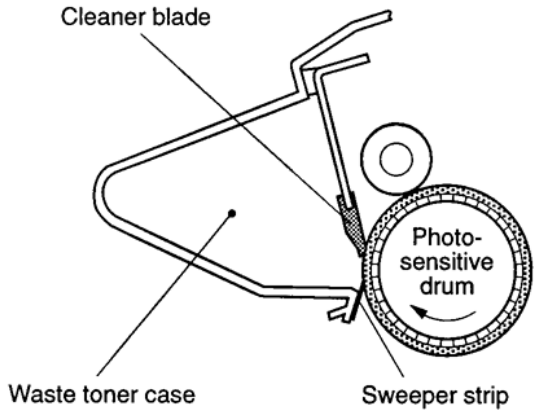
Figure 5-8 Photosensitive Drum



The photosensitive drum is the heart of the image formation system. This drum's special properties allow an image to form on the drum's surface and then transfer to paper. The drum is an aluminum cylinder coated with an organic-photoconductive material (OPC) (see figure 5-8). The photosensitive drum's aluminum base is electrically connected to ground. The OPC material becomes electrically conductive when exposed to light. Areas not exposed to light remain nonconductive and maintain their negative charge.

Cleaning Stage

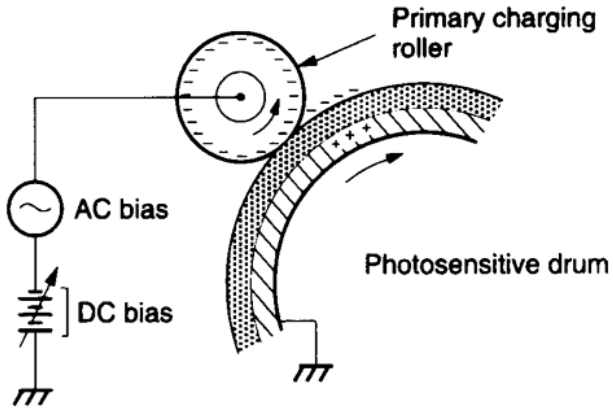
Figure 5-9 Cleaning the Photosensitive Drum



At the cleaning stage, the photosensitive drum's surface is prepared to hold an image. During printing, the drum rotates completely several times per printed page. Before forming the image for a given section of print, a cleaning blade removes toner from the previous rotation of the drum. The toner cartridge stores waste toner and prevents it from being used in later print jobs (see figure 5-9).

Conditioning Stage

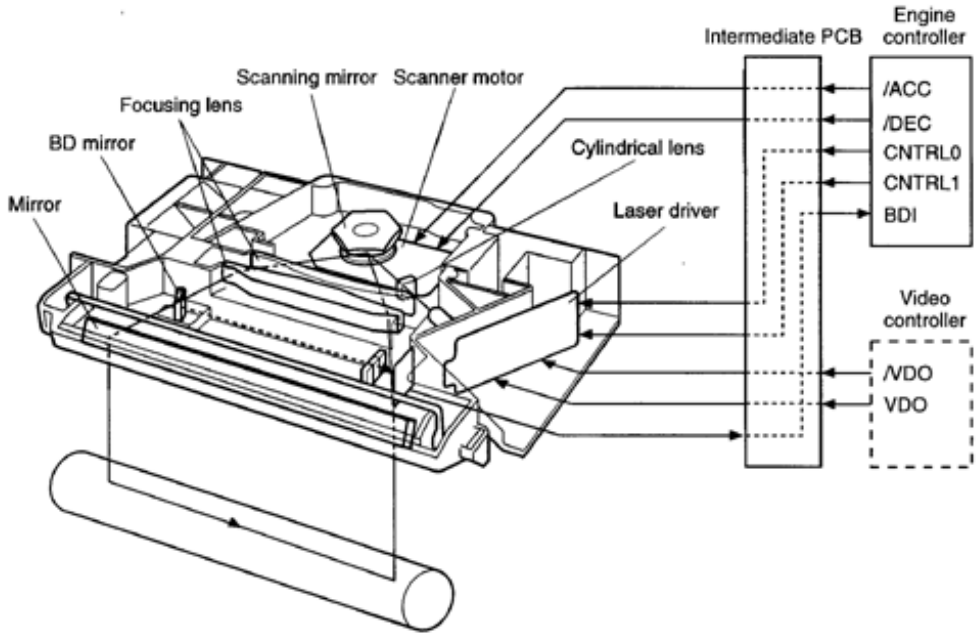
Figure 5-10 Primary Charging Roller



At the Conditioning Stage, the primary charging roller applies a uniform negative charge on the photosensitive drum’s surface. Conductive rubber coats the primary charging roller with an AC bias to erase any residual charges and maintain a constant potential on the drum’s surface. In addition, the primary charging roller applies a negative DC bias to create a uniform negative potential on the drum's surface.

Writing Stage

Figure 5-11 Laser Scanner System



At the writing station, a laser beam focuses laser light onto the photosensitive drum to discharge the drum's negative potential. This creates a latent electrostatic image, which later is developed into a visible image.

A small laser diode beam shines onto a rotating, 6-sided mirror. As the mirror rotates, the beam reflects off the mirror and sweeps the page from left to right.

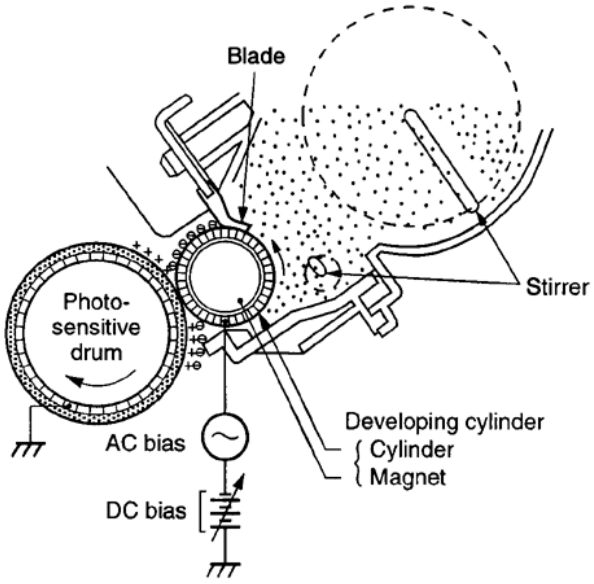
A set of lenses and mirrors focuses the horizontal sweeping beam through the laser beam access slot in the rear of the toner cartridge and onto the photosensitive drum. Because the beam sweeps the entire length of the drum while the drum rotates, the entire circumference of the drum can be covered. Each successive sweep of the beam is offset 1/1200th of an inch. This is how the printer achieves its 1200 dpi resolution.

At the beginning of each sweep (before the beam reaches the drum), the beam detect mirror reflects the beam. The momentary pulse of light goes to the Engine Controller Assembly, which converts the light to an electrical signal used to synchronize other activities in the printer and to diagnose problems with the laser scanner assembly.

Portions of the drum not exposed to the laser still contain the uniform negative potential (placed there by the primary charging roller), but those portions exposed to light have been discharged to ground to form the latent electrostatic image.

Developing Stage

Figure 5-12 Developing the Latent Electrostatic Image into a Visible Image



At the developing stage, the latent electrostatic image is developed into a visible image on the photosensitive drum. As shown in figure 5-12, the developing cylinder consists of a metallic cylinder that rotates around a fixed magnetic core inside the toner cavity. Toner is a powdery substance made of black, plastic resin bound to iron particles, which the magnetic core of the developing cylinder attracts. A rubber blade brushes the toner on the developing cylinder to a uniform thickness.

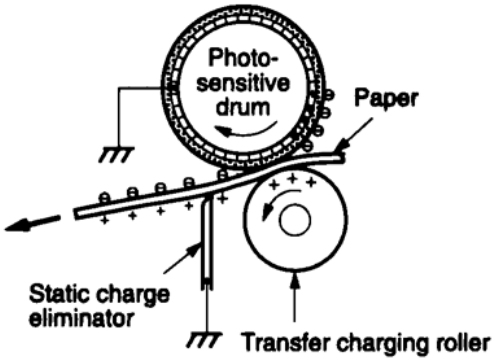
NOTE: Charges in the photosensitive drum's exposed areas are shown as positive in figure 5-12 even though they are actually negative. This means that the photosensitive drum potential is higher than that of the developing cylinder.

To obtain a negative surface charge, the toner particles rub against each other and the developing cylinder which is connected to a negative DC supply. The discharged (grounded) areas of the drum exposed to laser light attract the negatively charged toner. The negatively charged (non-exposed) areas repel the toner. An AC potential is applied to the developing cylinder to decrease the attraction between the toner and the cylinder's magnetic core and to increase the repelling action of toner against the areas of the drum not exposed to laser light. This AC potential improves density and contrast.

The print density setting (through the software) adjusts the developing cylinder's DC bias to change the force of attraction between the toner and drum.

Transferring Stage

Figure 5-13 Transferring the Toner Image on the Drum Surface to the Paper

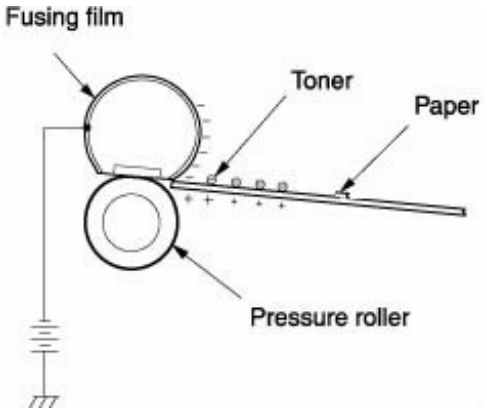


At the transferring stage, the toner image on the photosensitive drum's surface is transferred to the paper. The transfer roller applies a positive charge to the back of the paper, causing the paper to attract the negatively charged toner on the drum's surface (see figure 5-13).

The drum’s small radius combined with the stiffness of the paper causes the paper to peel away from the drum. The Static Charge Eliminator helps separate the paper from the drum by weakening the attractive forces between the negatively charged drum surface and the positively charged paper. Without this help, thin paper might wrap around the drum. The Static Charge Eliminator also prevents droplets on the printed image at low temperature and humidity. After separation, the paper moves to the fusing station and the drum rotates to the cleaning and conditioning stations.

Fusing Stage

Figure 5-14 Fusing Film and Pressure Roller



At the fusing stage, heat and pressure fuse the toner to the paper to produce a permanent image. As shown in figure 5-14, the paper passes between a fusing film and a pressure roller. To prevent the toner from getting dispersed during the fusing stage, this printer applies a negative DC voltage to the fusing film via the pressure roller shaft (which is merely a continuity path). A negative charge is applied to the surface of the paper, which improves the adhesion force of the toner particles to the paper and prevents dispersion of the toner particles.

The fusing heater comes up to fusing temperature very quickly and thus does not require any power while the printer is on STBY. This feature saves power while virtually eliminating the warm-up period (less than 10 seconds).

Paper Pick and Feed System

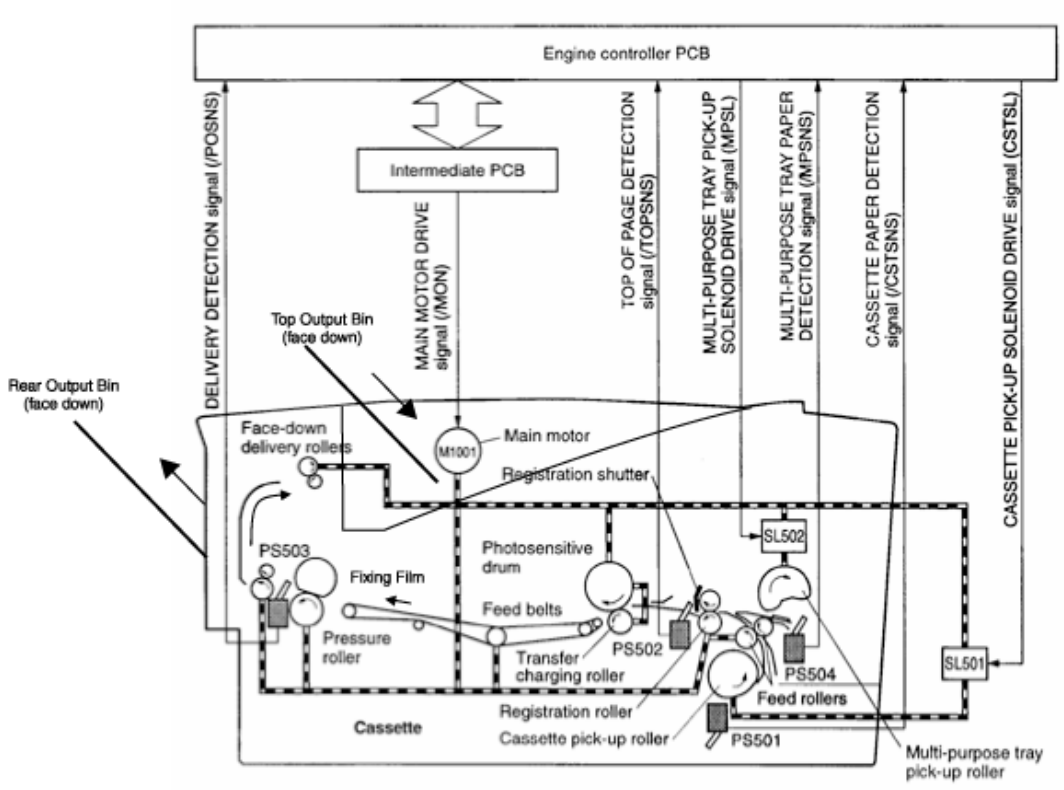
When the Formatter sends a print command to the Engine Controller Assembly, the main motor (M1001) and scanner motor start rotating and the fusing heater temperature control starts.

The paper feed system automatically picks print media from either Tray 1, Tray 2, or Tray 3 if installed and delivers it to the registration roller. Before the media reaches the registration roller, the separation pad separates any excess sheets of media and the registration shutter corrects the media's skew.

After the top-of-page sensor (PS502) detects the leading edge of the page, the Engine Controller Assembly sends a signal (BD) to the Formatter. This signal functions as a synchronization between the Controller Assembly and the Formatter. This synchronization allows the leading edge of the image on the photosensitive drum to match the leading edge of the page. After the transferring stage of the image formation process, the paper is fed to the fusing assembly by the feed belts.

The delivery sensor (PS503) detects the exiting paper, which is usually fed to the top or rear output bin.

Figure 5-15 Paper Feed System



Paper Detection

The model for paper detection is essentially the same for all 3 paper trays.The paper sensor levers shown in figure 5-15 detect the presence of paper in the paper trays. If the sensor does not detect any paper, the Formatter illuminates the display's LED until paper is added.

Paper Size Detection

The HP LaserJet 2100 printer does not contain a paper size detection mechanism; therefore, the printer cannot detect the size of paper set in the trays. The printer detects the paper size by measuring the time from when the top-of-page sensor (PS502) detects the leading edge of the page until the trailing edge of the page clears the sensor.

Paper Jam Detection

The paper feed system contains two photointerrupters (PS502 and PS503) to detect paper arriving or passing (see figure 5-15). If paper does not arrive or pass through these sensors within a specified period of time, the Engine Controller Assembly determines if a paper jam has occurred. If so, the Engine Controller Assembly stops the print operation and reports a paper jam to the Formatter.

6 Troubleshooting

Overview

This chapter discusses the following:

Troubleshooting Process - - - - - - - - - - - - - - - - - - 90

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Troubleshooting with Control Panel Messages- - - - - - - 94

Paper Handling Problems- - - - - - - - - - - - - - - - - 105

Evaluate the Test Pages - - - - - - - - - - - - - - - - - 109

Image Formation Troubleshooting- - - - - - - - - - - - - 110

Communication Troubleshooting - - - - - - - - - - - - - 139

Media Troubleshooting - - - - - - - - - - - - - - - - - - 129

Reference Diagrams - - - - - - - - - - - - - - - - - - - 141

Troubleshooting Process

Preliminary Operating Checks

Prior to troubleshooting a specific printer problem, ensure that the following conditions are met:

- The printer is plugged in and power is present in the outlet at the proper voltage.
- The selected paper tray contains media and has been properly loaded.
- The toner cartridge is installed properly.
- The printer is being maintained on a regular basis as described in “Printer Maintenance” (page 57).
- Any I/O devices are properly installed.
- The customer is using acceptable paper as specified in “Media Troubleshooting” (page 129).
- The printer is positioned on a solid, level surface.
- The line voltage does not vary more than 10% from the nominal rated value as specified on the Power Rating Label.
- The operating environment for the printer is within the temperature and humidity specifications listed in of this manual.
- The printer is never exposed to ammonia fumes such as those produced by diazo copiers or office cleaning materials.
- The printer is not exposed to direct sunlight.
- Non-HP components (such as refilled Toner Cartridges, font cartridges, and memory boards) are removed from the printer.

NOTE: Sudden changes in the printer’s environment can cause image defects and paper handling problems. Always make sure the printer is not exposed to direct sunlight, heating or cooling vents. Allow time for the printer and media to acclimate whenever changing environments (for example, moving it from a cold environment to a warm one). Acclimation can take anywhere from 3 to 24 hours depending on the ambient conditions.

Basic Fault Isolation

The troubleshooting process is a systematic approach that addresses the major problems first, then other problems as the causes for printer malfunctions and errors become apparent. “Troubleshooting Process Flow” (page 92) illustrates the major steps for troubleshooting the printing system. Each heading depicts a major troubleshooting step. A YES answer to the questions allows one to proceed to the next major step.

A NO answer indicates that additional testing and correction is needed. Proceed to the referenced location in the chapter and follow the directions for that area. After completing the additional testing and correcting the problem, proceed to the next major step.

NOTE: It is important to always follow this process in sequence. Failure to do so can result in increased repair time, difficulty, and expense.

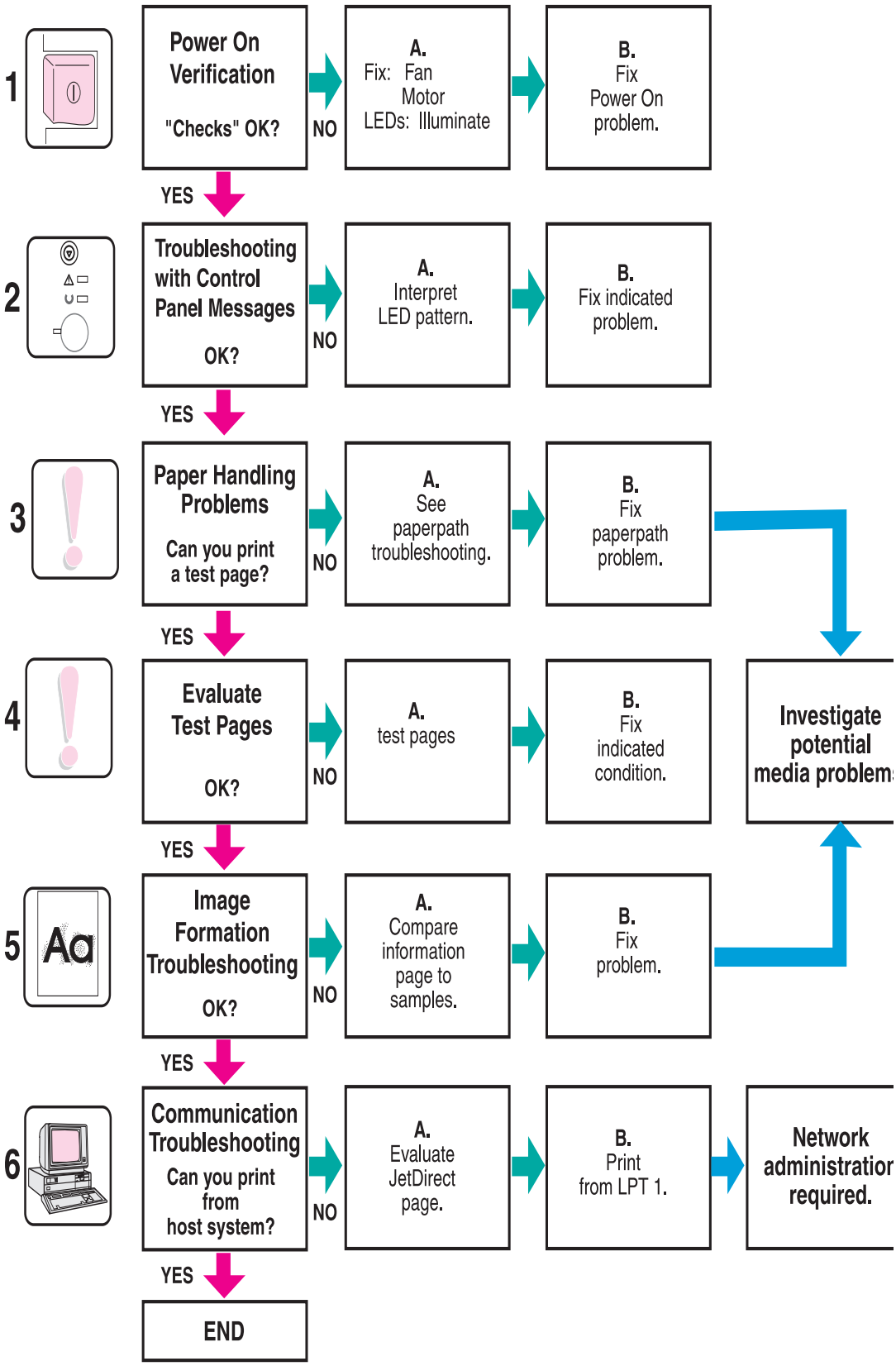
The following list describes the basic questions for the customer and the corresponding troubleshooting section to help quickly define the problem(s).

Table 6-1. Major Steps for Troubleshooting

"Power On" (page 93)	Does the printer perform the initialization and power-on sequence? This section gives the procedures for correcting power supply problems.
"Troubleshooting with Control Panel Messages" (page 94)	Do the Control Panel LEDs indicate an error condition? This section gives the procedures for clearing Control Panel messages.
Paper Handling Problems	Is it possible to print a test page? This section gives information about troubleshooting paper path and media problems.
"Evaluate the Test Pages" (page 109)	Is there information in the Status Log? This section gives the procedures for printing the information pages and evaluating and correcting the printer's configuration.
"Image Formation Troubleshooting" (page 110)	Does the print quality meet the customer's expectations? This section gives Toner Cartridge checks, information on EconoMode, image defect examples, and the repetitive defect ruler.
Media Troubleshooting	This section provides information on how to determine print media problems and correct them.
Communication Troubleshooting	Can the customer print from the host system successfully? This section describes how to determine if the printer is communicating properly with the host system.

Troubleshooting Process Flow

Figure 6-1 Troubleshooting Process Flow



Power On

It is important to have the printer's Control Panel LEDs functional as soon as possible in the troubleshooting process so that the printer's diagnostics can assist in locating printing errors. Following these steps will help pinpoint power problems quickly.

1 Confirm that the printer is plugged in and the power switch is on.

2 Verify that the fan and motors rotate.

3 Verify the formatter cables are connected properly.

4 Verify the Control Panel light pipes in the DIMM cover are not broken or damaged.

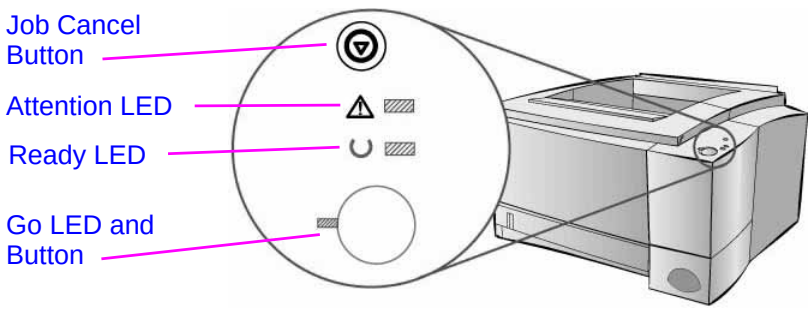
5 Verify that the DIMM cover is installed properly.

6 Verify that all connections to the Intermediate PCB are intact and that the PCB is not damaged. If the Intermediate PCB is damaged, replace it.

7 Check connections to the Engine Controller Assembly. If necessary, replace the Engine Controller Assembly.

8 Check fuser connectors, fan and main motor connectors, and laser scanner connector.

Troubleshooting with Control Panel Messages



Control Panel LED Messages

LED patterns provide both status and error messages. The LEDs can be in any one of the following states:

The following Control Panel LED patterns indicate various conditions of the printer in preparation for, or during, printing. If the Attention LED is on, the printer is experiencing an error. The messages are grouped according to error type - status, attendance, continuable, service, and accessory errors. In many cases the error will provide direct information about the defective component.

If the printer's LEDs indicate a continuable, service, or accessory error, secondary information is available by pressing the Go and Job Cancel buttons simultaneously. Releasing the keys will return to the original error state. Transitions in error states are marked by the LEDs flashing off briefly before displaying the next pattern.

NOTE: Secondary information about 79 service errors (unrecoverable firmware errors) is not included in the scope of this document. If a 79 Service error occurs, replace the Formatter.

See “Continuable, Service, and Accessory Errors” (page 97) for secondary information about each of these three types of errors.

Table 6-2. Control Panel LED Status Messages

Control Panel LED Pattern	Error message	Recommended Action
	Start-up. The Go, Ready, and Attention LEDs cycle one after another.The buttons have no effect until the printer is ready.	No action is needed.
	Ready. The Ready LED is on and the printer is ready to print. Pressing the GO Button will print a demo page.	No action is needed.
	Processing.The printer is receiving or processing data. Pressing JOB CANCEL cancels the current job. One or two pages may print as the printer clears the print job. The printer will return to the ready state after the job has been canceled.	No action is needed.

Control Panel LED Attendance Messages

Control Panel LED Pattern	Error message	Recommended Action
	Data.The Ready LED is blinking and the Go LED is on. Data is in the printer memory waiting to be printed.	Pressing the GO button prints from Tray 1 or from another tray if Tray 1 is empty and the paper size is supported in the other Tray. Pressing the JOB CANCEL button cancels the current job and the printer returns to ready.
	Manual Feed with Pause.The Go LED is blinking.	Pressing the GO button prints from Tray 1 or from another tray if Tray 1 is empty. Pressing the JOB CANCEL button cancels the current job and the printer returns to ready.
	Paper out.The attention LED is on. The printer is out of paper. The attention LED will stay on until paper is added.Pressing the GO or JOB CANCEL button has no effect.	Fill the printer with paper.
	Paper Out (requested tray) The GO LED is on. The requested tray is out of paper.	Adding paper to the requested tray causes the printer to start the print job from that tray. Pressing the GO button prints from another tray.Pressing the JOB CANCEL button cancels the current job.

Control Panel LED Attendance Messages (continued)

Control Panel LED Pattern	Error message	Recommended Action
	Attention The printer requires attention for one of the following reasons: a door is open the toner cartridge is missing paper is jammed in the printer	Pressing the GO button causes the printer to attempt to clear the paper jam. It may be necessary to clear the jam manually and push GO or close the top cover.

Continuable, Service, and Accessory Errors

More detailed information in the form of a secondary error message is available for each of the following three types of errors. The first entry in each of the following tables shows the primary error LED pattern. The remaining entries in each table illustrate the secondary error messages. The tables also contain information from the Status Log that typically appears in the Status Log area of the Self Test / Configuration Page.

Table 6-3. Secondary Information about Continuable Errors

Control Panel LED Pattern	Error message	Status Log Code	Recommended Action
	Continuable Error. Pressing the GO button causes the printer to attempt to recover from the error and print whatever it can. If the recovery is unsuccessful, the printer will return to the continuable error state. (Primary Error Message)		Press the GO button and continue printing, or press the GO and JOB CANCEL buttons simultaneously to view the secondary information.
	Memory Overflow (20 error) / Mem Full (Secondary Error Message)	30016	Press the GO button to print the transferred data (some data might be lost), then instruct the customer to simplify the print jobs or install additional memory.

Table 6-3. Secondary Information about Continuable Errors (continued)

Control Panel LED Pattern	Error message	Status Log Code	Recommended Action
	Temporary Engine Error (41.x Errors) (Secondary Error Message)	30034	Press the Go button. The page containing the error will automatically be reprinted. If the error persists: 1) Reseat the connections to the Laser Scanner and the Engine Controller Assembly. 2) Replace the Laser Scanner. 3) Replace the Engine Controller Assembly 4) Replace the Intermediate PCB.
	Print Overrun (21 error) (Secondary Error Message)	30017	Press the Go button to print the transferred data (some data might be lost), then instruct the customer to simplify the print jobs or install additional memory.
	I/O Error (22 error - Buffer Flow Error) (Secondary Error Message)	30027	Press Go to clear the message. (Data will be lost) Check for a loose cable connection and be sure to use a high quality cable. Some non-HP cables might be missing pin connections, or might otherwise not conform to the IEEE-1284 B specification.
	I/O Error (40 Error - Bad Connection) (Secondary Error Message)	30018	The connection between the printer and the EIO card has been broken. 1) Turn the printer off and reseat the card 2) Press Go to clear the message and continue printing.

Table 6-3. Secondary Information about Continuable Errors (continued)

Control Panel LED Pattern	Error message	Status Log Code	Recommended Action
	NVRAM Error (68 error) (Secondary Error Message)	30035 or 30036	Press GO to clear the message and continue printing. An error occurred in the printer's nonvolatile memory and one or more printer settings has been reset to its factory default. 1) Print a configuration page and check the printer settings to determine which values have changed. 2) While turning the printer on, hold JOB CANCEL until all the lights come on and stay on. This will clean up the NVRAM by removing old areas that are not being used.
	IIO Error (81 error) (Secondary Error Message)		The EIO accessory has encountered a critical error. 1) Power cycle the printer. 2) Reseat or replace the EIO accessory.
	Memory Configuration Error (Secondary Error Message)		1) Reprint the job. 2) Perform a cold reset. 3) Replace DIMMs/memory. 4) Replace the formatter.
	Personality, Job Related Error (Secondary Error Message)	30076	1) Perform a cold reset. 2) Remove/replace the language DIMM (PS DIMM). 3) If all else fails, replace the formatter.

Table 6-3. Secondary Information about Continuable Errors (continued)

Control Panel LED Pattern	Error message	Status Log Code	Recommended Action
	General Continuable Error (Secondary Error Message)		1) Check connections on the Intermediate PCB. 2) Replace the Formatter PCB.

Secondary Information about Service Errors

Control Panel LED Pattern	Error Message	Status Log Code	Recommended Action
	The printer has experienced an error and cannot recover. All of the LEDs are on. (Primary Error Message)		Press the GO and JOB CANCEL buttons simultaneously to view the secondary information.
	Engine error (error 55 - Engine Communication Error) (Secondary Error Message)	40055	A printer error has occurred. Press GO to clear the error message. *Check the connections to the Intermediate PCB and the Engine Controller Assembly. *Replace the Engine Controller Assembly
	Scanner Error (error 52) (Secondary Error Message)	40052	*Press GO. The page containing the error will automatically be reprinted. *Turn the printer off and reseat the Laser Scanner cables. *Replace the Laser Scanner

Secondary Information about Service Errors (continued)

Control Panel LED Pattern	Error Message	Status Log Code	Recommended Action
	Beam Error (error 51 - Bad Beam Detect) (Secondary Error Message)	40051	*Press Go. The page containing the error will automatically be reprinted. *Turn the printer off and reseat the Laser Scanner cables. *Replace the Laser Scanner
	Motor Error (57 Service -Scan Motor Error (Secondary Error Message)	40057	*Turn the printer off, then turn it back on. *Turn the printer off, then reseat the connection between the Laser Scanner Assembly and the Intermediate PCB. *Replace the Laser Scanner
	Fuser Error (50 service - Bad Fuser) (Secondary Error Message)	40050	1) Be sure that the Fuser is installed correctly and is fully seated. 2) Reseat the Fuser cables 3) Replace the Fuser 4) Replace the Engine Controller Assembly 5) Replace the Intermediate PCB.
	Formatter internal RAM or ROM error (Secondary Error Message)		Replace the Formatter

Secondary Information about Service Errors (continued)

Control Panel LED Pattern	Error Message	Status Log Code	Recommended Action
	Fan error (58 service - Fan Motor Error) (Secondary Error Message)	40058	*Turn the printer off, then turn it back on. *Turn the printer off, then reseat the connection between the Fan and the Intermediate PCB. *Replace the Fan *Replace the Engine Controller Assembly
	NVRAM error (68 service) (Secondary Error Message)		Replace the Formatter
	Scan buffer error (64 service) (Secondary Error Message)	40064	Cycle power. If the message persists, replace the Formatter.
	Dynamic Ram controller error (65 service) (Secondary Error Message)	40065	Replace the Formatter

Secondary Information about Service Errors (continued)

Control Panel LED Pattern	Error Message	Status Log Code	Recommended Action
	Miscellaneous interface hardware error (67 service) (Secondary Error Message)	40067	Check the I/O connections Verify that the cable is IEEE 1284 B compliant (if applicable)
	General Fatal Error (Secondary Error Message)		Cycle power.

Table 6-4. Secondary Information about Accessory Errors

Control Panel LED Patterns	Error Message	Status Log Code	Recommended Action
	Accessory error- the printer has experienced an error and cannot recover. All of the LEDs are blinking in unison. (Primary Error Message)		Press the GO and JOB CANCEL buttons simultaneously to view the secondary information.
	EIO port error (Secondary Error Message)		Verify connections Reseat or replace the EIO accessory. Replace Formatter

Table 6-4. Secondary Information about Accessory Errors (continued)

Control Panel LED Patterns	Error Message	Status Log Code	Recommended Action
	DIMM slot 1 error (Secondary Error Message)		Reseat the DIMM in slot 1. If the problem persists, replace the DIMM.
	DIMM slot 2 error (Secondary Error Message)		Reseat the DIMM in slot 2. If the problem persists, replace the DIMM.
	DIMM slot 3 error (Secondary Error Message)		Reseat the DIMM in slot 3. If the problem persists, replace the DIMM.

Paper Handling Problems

Print Test Pages

To confirm that the printer can pick and move paper, generate a Self-Test / Configuration page by depressing the GO and JOB CANCEL buttons simultaneously when the printer is in a ready state. If the printer can not produce a Self-Test / Configuration Page, generate an Engine Test Page. If an Engine Test page does not print, see “Paper Jam Troubleshooting” (page 105).

Engine Test

The engine test verifies that the print engine is functioning correctly. It is also useful for checking and adjusting registration.This test is very useful for isolating printer problems, because it does not involve the Formatter PCB. The engine test prints a full page of lines across the entire printable area.

See “Microswitch Control” (page 78) for instructions on performing an engine test.

NOTE: Ensure that the Toner Cartridge is installed in the printer. Also, the print motor must be stationary and the printer must be in the standby mode.

In order for an engine test print to be produced, paper must be loaded in the printer. The system checks for paper first in Tray 2, then Tray 1, and then in the optional Tray 3. Paper is pulled from the first tray containing paper.

Self-Test / Configuration Page

Use the Configuration Page to view the current printer settings, to help troubleshoot printer problems, or to verify installation of optional accessories, such as memory (DIMMs), JetDirect cards, and printer languages.

NOTE: If Status Log information is present, it will print in the Status area of the Configuration Page. If an HP JetDirect print server EIO card is installed, a JetDirect Configuration Page will also be generated.

See “Printing Self-Test/Configuration Page” (page 46) for a sample page.

Paper Jam Troubleshooting

Paper jams occur in the printer when paper does not reach or clear a photosensor along the printer’s paper path in a specific amount of time. The following table contains general questions and topics to explore prior to troubleshooting.

Table 6-5. General Paper Jam Troubleshooting Questions

Problem	Action
What is the frequency of the paper jams (e.g. continuous, one jam per 100 pages, one jam per 1000 pages, etc.)?	Verify with the customer. See “Troubleshooting with Control Panel Messages” (page 94) and “Status Log Messages” (page 109) and evaluate the Status Log. Perform a Continuous Self Test (See Chapter 4)
Do paper jams occur with a specific type of media?	Try using known good media. Refer to “Media Troubleshooting” (page 129).
Where does the leading edge of the first sheet of paper in the printer’s paper path stop when a jam occurs? Are any sheets of paper damaged or torn?	Attempt to duplicate the problem. Inspect the paper path and all paper path mechanical assemblies located before the leading paper jam. Use the “Continuous Self-Test” (page 47) to aid in locating paper jams.
Is the customer loading the paper trays correctly?	Observe the customer loading paper. Break the ream, do not fan the paper. Refer to proper paper handling procedures in “Media Troubleshooting” (page 129).
Is the customer overfilling the paper trays?	Ensure that the paper is NOT over the maximum fill marks in the paper trays. Observe the customer loading paper in the trays.
Are the paper tray guides set correctly?	Ensure all front and rear Tray 2 and optional Tray 3 guides are set correctly.
Does the printer need cleaning?	Inspect the paper path and paper path rollers. Refer to cleaning procedures in “Cleaning the Printer” (page 59).

Locating and Correcting Jams

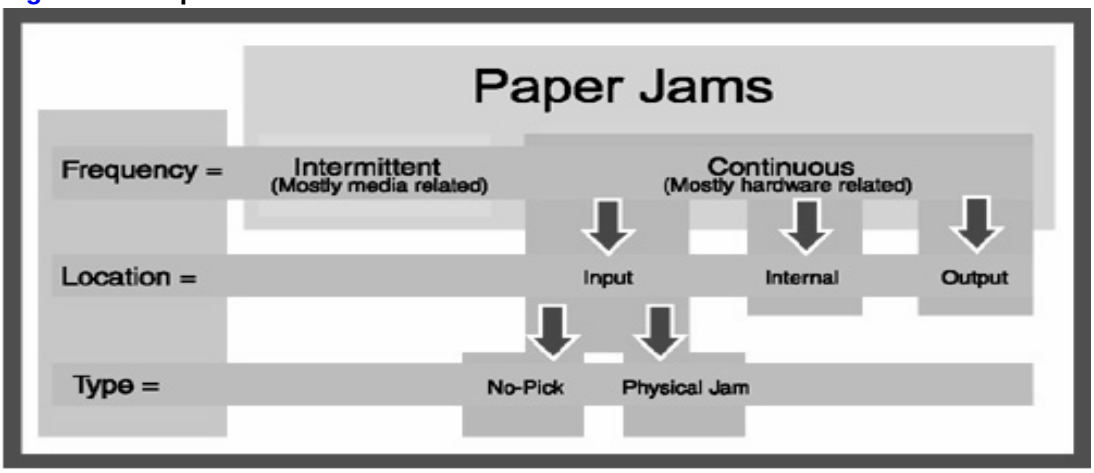
See the “Paper Pick and Feed System” (page 87) for an account of the operation of the paper feed system. After reading that section, use the diagrams below locate and troubleshoot the possible causes of the paper jam.

- “Printer Paper Path, Sensors, and Signals” (page 142)
- “Optional Tray 3 Paper Path, Sensors, and Signal” (page 143)
- “General Printer Component Locations” (page 144)

The process of correcting paper jams may be simplified by categorizing jams by frequency, location, and type of jam. See “Paper Jams” (page 107).

Frequency of Jams

Figure 6-2 Paper Jams



Use figure 6-2 to help determine the cause of paper jams. Jams in the paper path that occur intermittently are most often related to a deficiency in the media or environment. See “Media Troubleshooting” (page 129) for information about these defects.

Paper path jams that occur frequently, and in the same location of the printer, are most likely to be the result of a hardware problem.

Location of Jams

Frequently occurring jams may be further categorized by the location in the printer in which they occur. The three major areas of the printer are the input, the internal area, and the output. Because the pick-and-feed operation is almost identical for Trays 1,2, and 3, jams in the input area follow the same pattern, and may be broken into 2 additional categories.

Type of Jam

Input jams may occur as the result of either a failure of the printer to pick the paper from a tray or a failure to move the paper through the input area of the printer. Failure to pick the paper may result from either a defect in the pick-up roller or the separation pad; these items are indicated with asterisks (*) in Table 6-6.

The following tables summarize the recommended actions for input, internal, and output jams.

Table 6-6. Input Paper Jams

Possible Cause	Recommended Action
Tray Photosensors blocked or inoperative	Inspect and replace PS504 (Tray1) PS501 (Tray2) PS2001 (Tray3)
*Pick-up Roller dirty or inoperative	Clean or replace RB2-2900-000CN (Tray1) TBD (Tray2) RB2-2891-000CN (Tray3)
(*)Pick-up Assembly defective	Replace RG5-4128-000CN (Tray1) TBD (Tray2) RG5-4127-000CN (Tray3)

Table 6-6. Input Paper Jams (continued)

Possible Cause	Recommended Action
(*)Separation Pad	Inspect / replace TBD(Tray1) RB2-2835-000CN (Tray2) RB2-3008-000CN (Tray3)
Feed Rollers	Inspect and replace TBD (Tray1) TBD (Tray2) RB2-3490-0000CN(Tray3)
Solenoids	Inspect and replace SL504 (Tray1) SL501 (Tray2) SL2001 (Tray3)
Paper Feeder PCB (Tray 3 only) defective	Replace RG5-4277-000CN
Engine Controller Assembly/Intermediate PCB	Replace RG5-4248-000CN (4249 220V) and RG5-4250-000CN

Table 6-7. Internal Paper Jams

Possible Cause	Recommended Action
Tray Photosensors blocked or inoperative	Inspect and replace PS504 (Tray1) PS501 (Tray2) PS2001 (Tray3)
Registration Assembly defective	Replace RG5-4129-000CN
Transfer Roller Assembly defective	Replace RG5-4130-000CN
Toner Cartridge defective	Inspect and replace TBD
Transport Assembly defective	Inspect and replace Belts (RY7-5053-000CN) Rollers(RY7-5052-000CN)
Engine Controller Assembly/Intermediate PCB	Replace RG5-4248-000CN (4249 220V) and RG5-4250-000CN
Fusing Assembly defective	Replace RG5-4132-0000CN (includes PS503)

Table 6-8. Output Paper Jams

Possible Cause	Recommended Action
Fusing Assembly defective	Replace RG5-4132-0000CN (includes PS503)
Upper/Lower Face-Down Delivery Rollers	RB2-2849-000CN and RF5-2604-000CN
Engine Controller Assembly/Intermediate PCB	Replace RG5-4248-000CN (4249 220V) and RG5-4250-000CN

Media and Paper Handling Problems

If the print engine seems fully functional, yet paper jams persist, the problem may lie in the quality and type of media being used. See “Media Troubleshooting” (page 129) for more information.

Evaluate the Test Pages

Status Log Messages

Use the Status Log primarily to diagnose and troubleshoot intermittent printer errors, or to gain information about multiple error conditions that may occur simultaneously. Status Log information prints automatically on the Self-Test/Configuration Page. See also “Configuration Page Elements” (page 46), item 4, Status Log. The Status Log retains the printer’s last 10 error messages.

Status Log messages are listed in “Control Panel LED Messages” (page 94), according to their corresponding Error LED configuration.For a complete listing of Status Codes, please refer to the *Software Technical Reference Documentation* (Part Number 5021-0377). The complete PJL Status Code listing is contained in the appendix of the *Printer Job Language Technical Reference*. Also refer to HP’s web site at www.hp.com.

NOTE: Status codes that are not listed are not relevant to the HP LaserJet 2100.

Verify installed options

Verify that the options which are installed in the printer are reflected in the Configuration Page. If an installed device is not shown, reseat the device and print a new Configuration Page.

Image Formation Troubleshooting

When working with customers, obtain a print sample before troubleshooting the printer. Ask the customer to explain the quality they expect from the printer. The print sample will also help clarify the customer's explanation.

Often an image formation problem can be linked to media that is outside the specifications established by Hewlett-Packard for optimum printer performance. See "Media Troubleshooting" (page 129) for help with persistent image formation problems.

Table 6-9. Image Quality Checks

Image Quality Checks	Action
Does the problem repeat on the page?	Use the "Repetitive Defect Ruler" (page 127).
Is the Toner Cartridge full and is it manufactured by HP?	"Check the Toner Cartridge" (page 111).
Is the customer using print media that meets all HP paper specification standards?	For more information about HP's paper specification standards, see "Media Specifications" (page 28).
Is the print sample similar to those in the Image Defect Tables?	Compare and perform the actions recommended in the "Image Defect Tables" (page 112).
Is the problem on the Toner Cartridge drum or the Transfer Roller?	Perform the "Half Self-Test Functional Check" (page 127) to determine where the defect is. If a dark and distinct toner image is present on the drum's surface, assume that the first four functions of the electrophotographic process are functioning (cleaning, conditioning, writing, and developing - see Chapter 5: Functional Overview), and troubleshoot the failure as a transfer or fusing problem.
Does the media meet HP specifications?	See "Media Troubleshooting" (page 129).

Check the Toner Cartridge

Image formation defects are often the result of problems with the Toner Cartridge. Use the following list to ensure that the Toner Cartridge is still operable.

NOTE: Before replacing the Toner Cartridge, be sure to perform all the following checks.

- Ensure that the Toner Cartridge has toner. Full Toner Cartridge weight = 1130 grams (39.9 oz.) Empty Weight = 925 grams (32.6 oz.)
- Check the Toner Cartridge to see if it has been disassembled or refilled.
- Ensure that the Toner Cartridge is seated properly in the printer cavity.
- Inspect the cartridge for leaking toner through worn seals. (If the drum has been manually rotated it may have caused internal damage and toner spills may result.)
- White areas on the page may indicate that the drum has been exposed to light for too long. If white areas appear, stop the printer and wait a few minutes This should eliminate most defective images. If not, the Toner Cartridge may be placed in a dark environment for several days, which may restore some life to the drum.

NOTE: The Toner Cartridge is rated for 5,000 images at 5% coverage. Check the surface of the photosensitive drum in the cartridge to see if it has been damaged or scratched. Touching the drum will contaminate the photosensitive surface and may cause spotting and defects during printing.

EconoMode

EconoMode creates draft-quality printing by reducing the amount of toner on the printed page by up to 50%. Advise the customer to turn EconoMode on or off from the printer driver or software application.

CAUTION: HP does not recommend full-time use of EconoMode. If EconoMode is used full-time, it is possible that the toner supply will outlast the mechanical parts in the toner cartridge.

Image Defect Tables

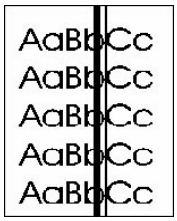
The quality of the printer's output is subject to the judgment of the user. This section of the manual helps define print quality defects and understand what factors affect print quality.

The print samples shown in the following figures illustrate some print quality defects. Keep copies of print quality defects encountered in the field with an explanation of their causes for future reference.

The image defects listed below are covered in the following tables.

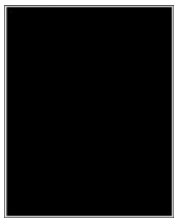
- "Black Lines (vertical)" (page 113)
- "Black Page" (page 113)
- "Blank Page" (page 113)
- "Blank Spots" (page 114)
- "Character Voids Class 1: Small sections of characters are missing toner. Class 2: Small sections of thin vertical lines are missing." (page 115)
- "Creases" (page 116)
- "Curl" (page 116)
- "Dark Print" (page 117)
- "Dirt on Back" (page 117)
- "Distorted Image" (page 118)
- "Dropouts" (page 118)
- "Faded Print/Bubbles" (page 119)
- "Gray Background" (page 120)
- "Horizontal Black Lines" (page 121)
- "Horizontal Dots" (page 121)
- "Horizontal White Lines" (page 122)
- "Light Print" (page 122)
- "Loose Toner" (page 123)
- "Repetitive Defects" (page 123)
- "Skew" (page 124)
- "Speckled Print" (page 125)
- "Toner Smear" (page 125)
- "Toner Specks" (page 126)
- "Vertical Smudges" (page 126)
- "Vertical White Lines" (page 126)

Hint If a defect is not depicted, record the probable cause along with the conditions in the printing environment and save a copy of the defect for future reference.



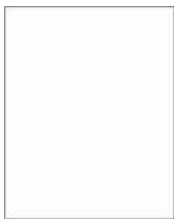
Black Lines (vertical)

Possible Cause	Action
Defective Toner Cartridge.	Inspect the Toner Cartridge for a scratched photosensitive drum or toner leaking through worn seals. Replace the Cartridge as necessary.
Fuser is contaminated or damaged.	Inspect the Fuser for toner build-up or scratches on the fuser rollers. Try cleaning with alcohol. Replace the Fuser if damaged.
Broken lens in scanner.	Replace laser scanner.



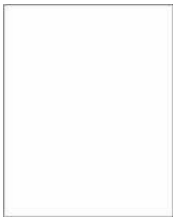
Black Page

Possible Cause	Action
Poor contact between the primary bias contact on the Engine Controller Assembly and the cartridge.	Inspect the contacts. If the parts are deformed or damaged, replace them.
Defective Toner Cartridge.	Replace the Toner Cartridge.
Engine Controller Assembly is defective. If the Engine Controller turns on the laser beam continuously, the entire surface of the Photosensitive drum is neutralized causing a completely black page.	Replace the Engine Controller Assembly and the Intermediate PCB.



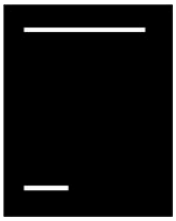
Blank Page

Possible Cause	Action
Software Configuration.	Make sure the application is not sending incorrect page length requests, or extra page eject commands. Print a self-test/configuration page to verify configuration.
Multiple Feeds. The printer may be feeding two or more pages at once because the paper is difficult to separate.	Remove the paper from the paper cassette and break the ream (do not fan the pages). *See* “Media Troubleshooting” (page 129)).



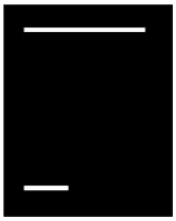
Blank Page (continued)

Possible Cause	Action
Sealing tape left in Toner Cartridge.	Remove the sealing tape.
Empty or defective Toner Cartridge.	1. If unsure, weigh the cartridge. Full weight = 1130 grams (39.9 oz.) Empty weight = 925 grams (32.6 oz.) Note: Some toner may reside in the waste toner cavity, affecting the weight of the cartridge. The weights above include waste toner. 2. Perform the “Half Self-Test Functional Check” (page 127) or try a known good Toner Cartridge. Replace the Toner Cartridge if necessary.
Poor contact between the developing bias contact on the Engine Controller Assembly and the cartridge contact	Inspect the contacts. If the parts are damaged, replace them.
Engine Controller Assembly is defective.	1. Clean the High Voltage Power Supply contacts. 2. Replace the Engine Controller Assembly and the Intermediate PCB.
No drum ground path.	With no ground path the drum cannot discharge. The negative charge on the drum repels toner, and leaves a white page with bubble print. See “Faded Print/Bubbles” (page 119). 1. Check the drum ground. See “DC Bias Voltage Contacts Replacement” (page 245) 2. Replace the Engine Controller Assembly and the Intermediate PCB. 3. Replace the gear plate.
Defective Intermediate PCB.	Replace the Intermediate PCB.



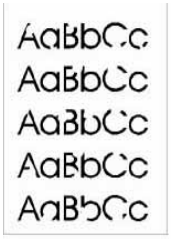
Blank Spots

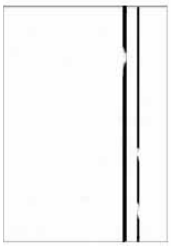
Possible Cause	Action
Paper does not meet printer specifications or is stored improperly.	1. Print a few more pages to see if the problem corrects itself. 2. Turn over the stack of paper in the tray. Also try rotating the paper 180 degrees. 3. Check the paper (or other print media) type and quality. Replace the paper, and advise the customer to use the recommended paper and store it properly.
Dirty or deformed Transfer Roller.	Replace the Transfer Roller.



Blank Spots

Possible Cause	Action
Empty or defective Toner Cartridge.	Replace the Toner Cartridge.
	See also “Dropouts” (page 118).

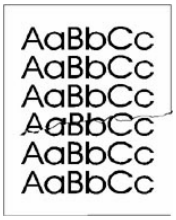




Character Voids

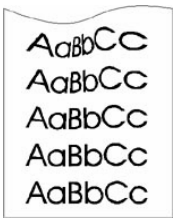
Class 1: Small sections of characters are missing toner.
Class 2: Small sections of thin vertical lines are missing.

Possible Cause	Action
Paper surface too rough. Toner migrates to low spots, leaving higher areas void.	User paper with correct finish (smoothness) meeting HP specifications. See “Media Troubleshooting” (page 129).
Printing on wrong side of paper. The label on the ream of paper indicates which side to print on. The different surface properties of some papers may cause problems if loaded wrong side up.	Check for the arrow on the paper wrapper. Be sure paper is loaded with the arrow pointing down in the paper trays, or arrow pointing up in Tray 1. If the paper does not have an arrow, try printing on the other side.
High moisture in paper.	User paper that meets HP specifications. See “Media Troubleshooting” (page 129).
Paper surface too smooth for proper toner adhesion.	User paper with correct finish (smoothness) meeting HP specifications. See “Media Troubleshooting” (page 129).
Bad transparencies. Transparencies can have this problem because they are not designed for proper toner adhesion.	Try another brand of transparency.
Bad Transfer Roller. If the Transfer Roller has finger oils on its surface, is dirty or worn out, this problem can result.	Clean the Transfer Roller using a dry, lint-free cloth. DO NOT touch the Transfer Roller with bare skin. If the problem persists, replace the Transfer Roller Assembly.



Creases

Possible Cause	Action
Paper does not meet printer specifications or is stored improperly.	1. Print a few more pages to see if the problem corrects itself. 2. Turn over the stack of paper in the tray. Also try rotating the paper 180 degrees. 3. Check the paper (or other print media) type, weight, and quality. Replace the paper, and advise the customer to use the recommended paper and store it properly.
Printer's operating environment does not meet specifications.	Make sure the printer's operating environment meets specifications. See "Operating Environment" (page 26)
Paper is loaded incorrectly.	Make sure paper is loaded correctly and that the guides fit properly against the paper stack.
Wrong tray.	Print from a different tray (such as Tray 1).
Wrong output bin for paper type.	Print to a different output bin (top or rear output bin).
Obstruction in paper path.	1. Check the paper path for paper or label debris. 2. Check for damaged components that could be creasing the paper.

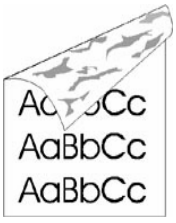


Curl

Possible Cause	Action
Paper does not meet printer specifications or is stored improperly.	1. Print a few more pages to see if the problem corrects itself. 2. Turn over the stack of paper in the tray. Also try rotating the paper 180 degrees. 3. Check the paper (or other print media) type and quality. Replace the paper, and advise the customer to use the recommended paper and store it properly. See "Media Troubleshooting" (page 129)
Printer's operating environment does not meet specifications.	Make sure the printer's operating environment meets specifications. See "Operating Environment" (page 26)
Wrong output bin.	Print to a different output bin (top or rear output bin).
	See also "Dropouts" (page 118).

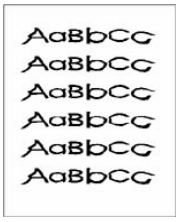
Dark Print

Possible Cause	Action
Poor contact between the drum grounding contact pin of the drive unit and the cartridge contact.	Clean the contacts. Replace the contacts if the problem persists after cleaning.
Poor contact between the primary bias contact on the Engine Controller Assembly and the cartridge contact	Clean the contacts. Replace the contacts if the problem persists after cleaning.
Defective Laser Scanner	Replace the Laser Scanner
Defective Engine Controller Assembly	Replace the Engine Controller Assembly and the Intermediate PCB.



Dirt on Back

Possible Cause	Action
Particles accumulate over time inside printer (Tray Separation Roller, Feed Roller, Transfer Roller, Fuser, Toner Cartridge).	1. Print at least 10 pages to see if the problem goes away. 2. Print a cleaning page. See “To Start Engine Cleaning” (page 60). Identify and clean the dirty part according to the “Repetitive Defect Ruler” (page 127). If dirt cannot be removed, replace the dirty part. 3. Check for toner leaks.
Paper does not meet printer specifications or is stored improperly.	1. Print a few more pages to see if the problem corrects itself. 2. Turn over the stack of paper in the tray. Also try rotating the paper 180 degrees. 3. Check the paper (or other print media) type and quality. Replace the paper, and advise the customer to use the recommended paper and store it properly. See “Media Troubleshooting” (page 129).
Dirt on an internal roller	Use the “Repetitive Defect Ruler” (page 127) to determine the dirty roller. Clean or replace it.
Dirty feed belt, feed guide, or fuser entrance guide	Clean the dirty areas.



Distorted Image

Possible Cause	Action
Paper does not meet printer specifications or is stored improperly.	1. Print a few more pages to see if the problem corrects itself. 2. Turn over the stack of paper in the tray. Also try rotating the paper 180 degrees. 3. Check the paper (or other print media) type and quality. Replace the paper, and advise the customer to use the recommended paper and store it properly. See “Media Troubleshooting” (page 129)
Printer’s operating environment does not meet specifications.	Make sure the printer’s operating environment meets specifications. See “Operating Environment” (page 26).
Wrong output bin for paper type.	Print to a different output bin.
Poor connection to the Intermediate PCB	Reconnect the cables from the Laser Scanner Assembly to the Intermediate PCB (J1001, J1009)
Poor connection of cables to the Engine Controller Assembly.	Reseat the cables connected to the Engine Controller Assembly (J410).
Defective Laser Scanner.	Replace the Laser Scanner.
Main motor failure.	Replace main motor.
Gear train failure.	Replace gear plate.
Defective Engine Controller Assembly.	Replace the Engine Controller Assembly and the Intermediate PCB.

Dropouts

Possible Cause	Action
Paper might be too smooth.	Check the paper (or other print media) type and quality. See “Media Troubleshooting” (page 129).
Printer’s operating environment does not meet specifications.	Make sure the printer’s operating environment meets specifications. See “Operating Environment” (page 26)
Wrong toner density setting.	Adjust the toner density setting in the print driver. Make sure EconoMode is off.
Single sheet of paper defective.	Try reprinting the job.

Dropouts (continued)

Possible Cause	Action
Paper does not meet specifications. The paper moisture content, conductivity, or surface finish may not work correctly with the electrophotographic process.	Try a different paper lot. See “Media Troubleshooting” (page 129).
Engine Controller defective (low primary voltage or incorrect high voltage).	Replace the Engine Controller.
Transfer Roller defective.	Replace the Transfer Roller. See also “Blank Spots” (page 114)
Hot offset after running narrow or thin media.	Let engine cool and retry printing.

Faded Print/Bubbles

Possible Cause	Action
No drum ground path.	With no ground path the drum cannot discharge. The negative charge on the drum repels toner, and leaves a white page with bubble print. 1. Check the drum ground. See “DC Bias Voltage Contacts Replacement” (page 245)
EconoMode is on. EconoMode saves toner by reducing the dot density. This may appear to be a print quality problem in some cases.	Turn EconoMode off.
Toner supply is low.	Shake the cartridge gently to redistribute the toner, or replace the cartridge.
Paper does not meet specifications. The moisture content, conductivity, or surface finish may not work correctly with the electrophotographic process.	Try a different paper lot. See “Media Specifications” (page 28)).

Faded Print/Bubbles (continued)

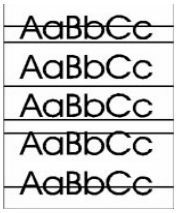
Possible Cause	Action
Transfer Roller is defective or incorrectly installed. If the transfer roller loses conductivity, it cannot effectively pull toner from the drum to the paper.	Inspect the Transfer Roller for proper installation and contact. If the Transfer Roller is damaged, replace it.
High voltage contact springs are dirty or defective. The high voltage contacts are mounted on the Engine Controller Assembly and protrude into the toner cartridge cavity.	Check the contacts for functionality. If damaged, replace the Engine Controller Assembly and the Intermediate PCB.
Engine Controller Assembly is defective.	Replace the Engine Controller Assembly and the Intermediate PCB.

Gray Background

Possible Cause	Action
Wrong toner density setting.	Adjust the toner density setting in the printer driver. Make sure EconoMode is off.
Printing on envelope seams. Printing on an envelope seam can cause a background scatter problem.	Move the text to an area without seams. If not printing on seams, try a higher print density setting. See “Media Troubleshooting” (page 129).
Paper does not meet printer specifications or is stored improperly.	1. Print a few more pages to see if the problem corrects itself. 2. Turn over the stack of paper in the tray. Also try rotating the paper 180 degrees. 3. Check the paper (or other print media) type and quality. Replace the paper, and advise the customer to use the recommended paper and store it properly. See “Media Specifications” (page 28)
Inside of printer is dirty (toner may have leaked out of the toner cartridge).	Clean inside of printer (see “Cleaning the Printer” (page 59)). Install a new Toner Cartridge if leaking.
Printer’s operating environment does not meet specifications.	Make sure the printer’s operating environment meets specifications. See “Operating Environment” (page 26)
Faulty Toner Cartridge.	Replace the Toner Cartridge.
	See also “Dark Print” (page 117).

Gray Background (continued)

Possible Cause	Action
Poor contact between the primary bias contact on the Engine Controller Assembly and toner cartridge contact.	Check developer bias spring.

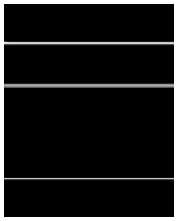


Horizontal Black Lines

Possible Cause	Action
Toner Cartridge not seated properly.	Remove the Cartridge and reinsert it.
Repetitive defect. If the lines are repeated at a consistent interval down the page, this is a repetitive defect.	Refer to “Repetitive Defect Ruler” (page 127) to isolate and fix the problem
Fuser entrance guide is dirty	Clean the guide
Fuser Film Unit is scarred	Replace the Fuser FIlm Unit after determining and removing the cause of the scarring
Toner Cartridge is scarred.	Replace the Cartridge.

Horizontal Dots

Possible Cause	Action
Deformed or deteriorated Transfer Roller.	Replace the Transfer Roller.
Dirty static eliminator teeth.	Clean the static eliminator.
Poor contact between the Static Eliminator and the Engine Controller Assembly.	Inspect the contacts. If parts are damaged or deformed, replace them.
Poor contact between the transfer roller contact on the Engine Controller Assembly and the transfer charging roller shaft contact	Inspect the contacts. If parts are damaged or deformed, replace them.
Defective Engine Controller Assembly.	Replace the Engine Controller Assembly and the Intermediate PCB.



Horizontal White Lines

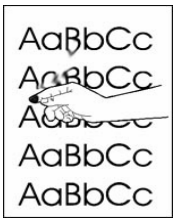
Possible Cause	Action
Toner Cartridge is nearly empty. This can cause uneven toner distribution.	Remove the Toner Cartridge and shake it gently. The cartridge will soon require replacement.
Toner Cartridge has been exposed to too much light.	Store the Toner Cartridge in a darkened environment for several days. This may restore the photosensitive potential.
Foreign objects in beam path. Any foreign objects will block the light from developing an image on the Photosensitive drum.	Remove the Toner Cartridge and check for damage. Replace the Toner Cartridge if it is damaged. Remove the Printer Cover and inspect the path from the Laser Scanner to the Toner Cartridge drum, looking for foreign objects in the beam path.
Dirty or obstructed fuser entrance guide	Clean the Fuser entrance guide
Scared or obstructed Fuser film unit surface	Replace the Fuser film unit
Scarring on the photosensitive drum or defective developing cylinder	Replace the Toner Cartridge
Dirty mirror in Laser Scanner	Replace the Laser Scanner

Light Print

Possible Cause	Action
Wrong toner density setting.	Adjust the toner density setting in the print driver. Make sure EconoMode is off.
Toner Cartridge requires cleaning	See “Toner Cartridge Cleaning” (page 61)
Paper does not meet printer specifications or is stored improperly.	1. Print a few more pages to see if the problem corrects itself. 2. Turn over the stack of paper in the tray. Also try rotating the paper 180 degrees. 3. Check the paper (or other print media) type and quality. Replace the paper, and advise the customer to use the recommended paper and store it properly. See “Media Troubleshooting” (page 129).
Poor contact between the Engine Controller Assembly and the transfer roller shaft contact.	1. Clean the contacts if they are dirty. If the problem remains after cleaning, or if parts are damaged or deformed, replace them. 2. Replace the Engine Controller Assembly and the Intermediate PCB if necessary.

Light Print (continued)

Possible Cause	Action
Defective Laser Scanner or Transfer Roller.	Perform the Half-Self-Test. If the test passes, replace the transfer roller. If the test fails, replace the Laser Scanner.
Toner Cartridge is low.	Replace the Toner Cartridge.
	See also “Faded Print/Bubbles” (page 119).



Loose Toner

Possible Cause	Action
Dirt in the printer.	1. Print a few more pages to see if the problem corrects itself. 2. Clean the inside of the printer. See “Engine Cleaning” (page 60).
Paper might be too smooth or too rough.	Check the paper (or other print media) type, smoothness, and quality. See “Media Troubleshooting” (page 129)
Defective Fuser.	Replace the Fuser.
Toner Cartridge is defective.	Replace the Toner Cartridge.

Repetitive Defects

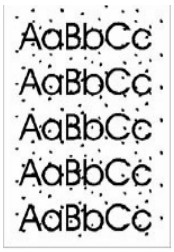
Possible Cause	Action
Dirty Rollers. Any dirty roller in the paper path may result in a repetitive print defect.	Examine and clean rollers in the paper path. See “Repetitive Defect Ruler” (page 127).
Paper does not meet specifications: The surface of the paper may be too coarse, causing repeated marks.	Try a different paper lot. See “General Media Specifications” (page 28).
Toner Cartridge is damaged. The circumference of the photoconductive drum inside the toner cartridge is 94 mm (3.7 inches). If the defect repeats at this interval, the defect is associated with the drum.	Inspect the drum for scratches or damage. Replace the Toner Cartridge.

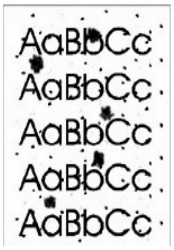
Repetitive Defects (continued)

Possible Cause	Action
Fuser is dirty or defective. If the defect repeats 75 mm (2.95 inches) on the front of the page, the defect is associated with the Fusing Film unit. If the defect repeats at 63 mm (2.48 inches) on the back of the page, the defect is associated with the Pressure Roller. See also “Repetitive Defect Ruler” (page 127).	Clean the Fuser using alcohol. If the problem persists, replace the Fuser.
Gears are worn, causing slippage or jumping.	Inspect the gears driving the Toner Cartridge and the Fuser. Replace the Main Drive Assembly if necessary.

Skew

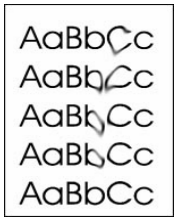
Possible Cause	Action
Paper does not meet printer specifications or is stored improperly.	1. Print a few more pages to see if the problem corrects itself. 2. Turn over the stack of paper in the tray. Also try rotating the paper 180 degrees. 3. Check the paper (or other print media) type and quality. Replace the paper, and advise the customer to use the recommended paper and store it properly. See “Media Troubleshooting” (page 129)
Paper is not loaded correctly or trays are not adjusted properly.	Make sure paper is loaded correctly and that the front and back paper tray guides fit properly against the paper stack.
Registration Assembly is defective.	Inspect the Registration Assembly and if replace if necessary.





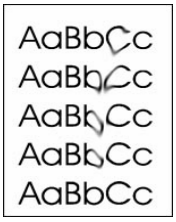
Speckled Print

Possible Cause	Action
Particles accumulate over time inside printer (Tray Separation Roller, Feed Roller, Transfer Roller, Fuser, Toner Cartridge).	1. Print at least 10 pages to see if the problem goes away. 2. Print a cleaning page. See “To Start Engine Cleaning” (page 60). Identify and clean the dirty part according to the “Repetitive Defect Ruler” (page 127). If dirt cannot be removed, replace the dirty part. 3. Check for toner leaks.
Delivery Roller is dirty	Clean the delivery roller.
Obstruction in the paper path.	Check and clear paper path.



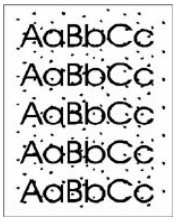
Toner Smear

Possible Cause	Action
Dirt in the printer.	1. Print a few more pages to see if the problem corrects itself. 2. To clean the inside of the printer see “Engine Cleaning” (page 60).
Dirty Fusing Rollers. Toner build-up can cause the print on a page to smear.	Remove and inspect the Fuser for excessive toner build-up. Clean using alcohol.
Paper might be too smooth.	Check the paper (or other print media) type and quality.
Defective Toner Cartridge.	Replace the Toner Cartridge. (See instructions with the Toner Cartridge.)
Fuser is defective. The print will smear if the Fuser is not heated sufficiently to bond the toner image to the paper.	Replace the Fuser.
The Static Eliminator is dirty or is not grounded, allowing a static charge to remain on the page.	Clean using compressed air. Replace assembly if damaged.
Engine requires cleaning	See “Engine Cleaning” (page 60)
Toner Cartridge requires cleaning	See “Toner Cartridge Cleaning” (page 61).



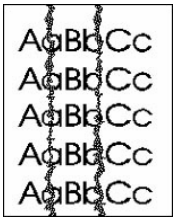
Toner Smear (continued)

Possible Cause	Action
Engine Controller is defective. The Engine Controller regulates fusing roller temperature.	If a new Fuser does not resolve the problem, replace the Engine Controller Assembly.



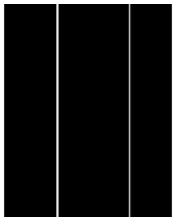
Toner Specks

Possible Cause	Action
Dirt in printer.	1. Print a few more pages to see if the problem corrects itself. 2. Clean the inside of the printer (“Engine Cleaning” (page 60).
Paper does not meet printer specifications or is stored improperly.	1. Print a few more pages to see if the problem corrects itself. 2. Turn over the stack of paper in the tray. Also try rotating the paper 180 degrees. 3. Check the paper (or other print media) type and quality. Replace the paper, and advise the customer to use the recommended paper and store it properly.
Engine requires cleaning	See “Engine Cleaning” (page 60)



Vertical Smudges

Possible Cause	Action
Paper path contamination or damage.	1. Check the Toner Cartridge and replace it if necessary. 2. Check the Fuser and replace it if necessary.
	See the “Repetitive Defect Ruler” (page 127).



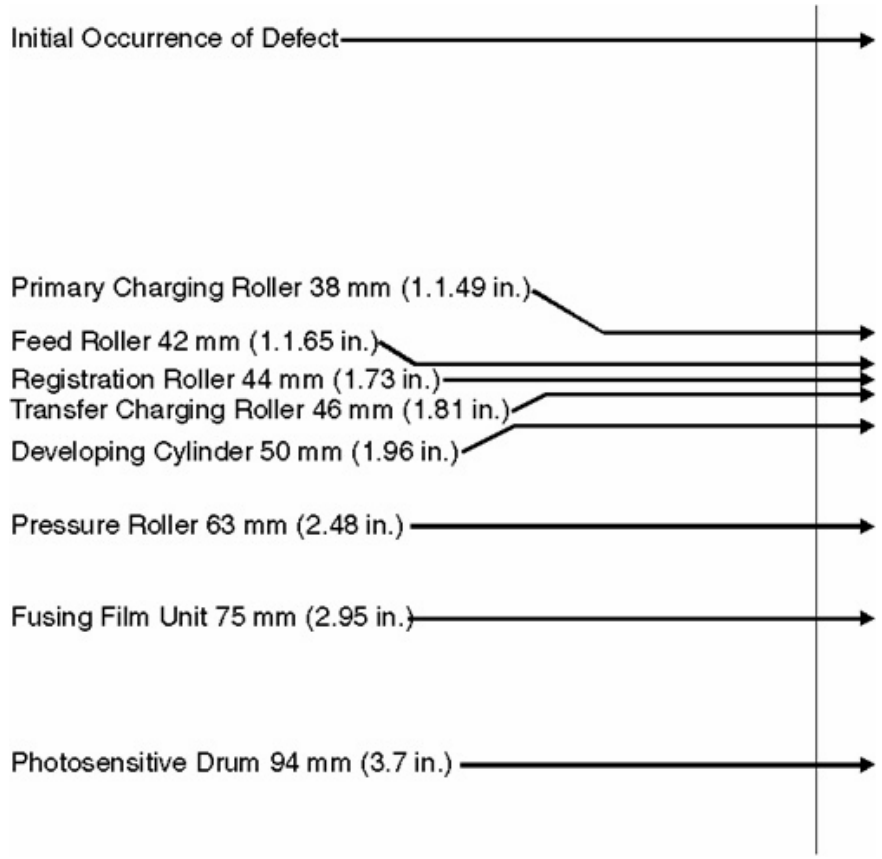
Vertical White Lines

Possible Cause	Action
Lack of toner or faulty Toner Cartridge.	Redistribute the toner in the Toner Cartridge. If the problem persists, replace the Toner Cartridge.
Dirt in the laser path.	Clean the laser path. (Remove the Laser Scanner Assembly and clean the lens.)
Defective Fuser.	Replace the Fuser Assembly.
Dirty mirror in the Laser Scanner.	Replace the Laser Scanner.

Repetitive Defect Ruler

Repetitive print defects usually are associated with a specific roller within the printer or the Toner Cartridge. Use Figure 7-1 to isolate the cause of repetitive print defects. Align the first occurrence of the defect with the top of the “ruler” (at the top or bottom of the misprinted page), and measure to the next occurrence of the defect to determine the roller in question. When the defect pattern matches the pattern of the ruler, replace the indicated roller.

Figure 6-3 Repetitive Defect Ruler


Initial Occurrence of Defect
Primary Charging Roller 38 mm (1.1.49 in.)
Feed Roller 42 mm (1.1.65 in.)
Registration Roller 44 mm (1.73 in.)
Transfer Charging Roller 46 mm (1.81 in.)
Developing Cylinder 50 mm (1.96 in.)
Pressure Roller 63 mm (2.48 in.)
Fusing Film Unit 75 mm (2.95 in.)
Photosensitive Drum 94 mm (3.7 in.)

Half Self-Test Functional Check

The electrophotographic process can be subdivided into the following stages:

- Cleaning (removes excess toner from drum surface)
- Conditioning (places a uniform electrical charge on drum)
- Writing (laser strikes surface of drum to create latent image)
- Developing (forms the toner image on drum)
- Transferring (charges transfer the image to paper)
- Fusing (heat and pressure produces a permanent image)

The purpose of the Half Self Test Check is to determine which process is malfunctioning. Perform the test as follows:

1 Print a Configuration Page.

2 Open the top cover after the paper advances half-way through the printer (about five

seconds after the Main Motor begins rotation). The leading edge of the paper should have advanced past the Toner Cartridge.

3 Remove the Toner Cartridge.

4 Open the Toner Cartridge's drum shield to view the drum's surface.

If a dark and distinct toner image is present on the drum's surface, assume that the first four functions of the electrophotographic process are functioning (cleaning, conditioning, writing, and developing - see Chapter 5: Functional Overview), and troubleshoot the failure as a transfer or fusing problem.

If no image is present on the photosensitive drum, perform the Drum Rotation Functional Check.

Drum Rotation Functional Check

The photosensitive drum, located in the Toner Cartridge, must rotate for the print process to work. The photosensitive drum receives its drive from the Main Drive assembly. To verify whether the drum is rotating:

1 Open the top cover.

2 Remove the Toner Cartridge.

3 Mark the cartridge's drive gear with a felt-tipped marker. Note the position of the mark.

4 Install the Toner Cartridge and close the top cover. The start-up sequence should rotate the drum enough to move the mark.

5 Open the printer and inspect the gear that was marked in step 3. Verify that the mark moved. If the mark did not move, inspect the Main Drive assembly to ensure that it is meshing with the Toner Cartridge gears. If the drive gears function, and the drum does not move, replace the Toner Cartridge.

NOTE: This test is especially important if refilled Toner Cartridges are in use.

Media Troubleshooting

Media defects cause both paper jams and image defects. If correcting the previously described conditions does not eliminate the printing problem, investigate the media as the source of the defect.

Problems with paper are sometimes difficult to detect. Following a standard troubleshooting procedure may help isolate media-related problems. The steps to follow are:

- Determine if the problem is “A Paper or Printer Problem?” (page 129)?
- “Isolate a Paper Path” (page 129)
- “Isolate a Paper Brand” (page 130)
- “Isolate a Paper Type” (page 132)
- “Evaluate Paper User Practices” (page 137)
- “Evaluate Environmental Conditions” (page 137)

A Paper or Printer Problem?

When determining the cause of a printer failure, a distinction must be made between problems relating to the printer itself and those involving paper. Often a problem which first appears to be related to the printer is actually a matter of poor paper selection of handling. To determine if a problem is caused by the printer or the paper, following a few simple steps can be helpful:

- Turn paper over in the tray to print on the reverse side.
- Rotate sheets 180 degrees (end to end) to feed with a different leading edge.

If the symptoms cease, or change in some way, it can be assumed that the problems are caused by the paper.

Isolate a Paper Path

Try using the straightest paper path

Some problems can be avoided by using the straightest available paper path. Usually this means paper will feed from the upper paper tray or manual feeder, and exit into the rear output tray (if available). This path is recommended for envelopes and media with a heavy basis weight.

Determine if the problem is caused by duplexing

Paper that has just made a pass through the printer can show an increase in paper curl. This paper curl increases image dropout, and pick-up and stacking problems. When the second pass is made, paper may no longer meet the specifications for moisture and curl. Dry paper may hold static charges which affect print quality and stacking. Image misalignment front-to-back on a duplexed page may be caused by paper shrinkage.

Isolate the source from which the printer jams

Where was the paper being fed from? Possible sources include:

- Standard Paper Tray
- Tray 1
- Optional Tray

Determine where paper jams occur

Check where paper stops when a jam occurs. Types of jams include:

- Input Paper Jams
- Internal Paper Path Jams
- Output Tray Jams

Determine whether the printer is experiencing misfeeds or multi-feed jams

The following are some possible causes of misfeeds:

- The paper may be too stiff. Check basis weight and measure caliper. See “Basis Weight Field Test” (page 38) and “Caliper Field Test” (page 39).
- The paper may be too smooth. Check the finish. See “Paper Finish Field Test” (page 40)
- The paper may be too heavy or too light. Check basis weight. See “Basis Weight Field Test” (page 38).
- The customer may be attempting to print embossed paper, pre-printed forms, or perforated paper which does not meet HP specifications. (See the following section “Isolate a Paper Type” for details about the issues involved in printing on embossed paper.
- The paper may be loaded incorrectly. Turn over the sheets in the paper tray to determine if in-ream curl is causing misfeeds.
- The customer may be fanning paper before loading it into the paper tray.
- The customer may be adding paper in small amounts. Do not add small amounts of paper or mix types of paper in the tray.
- The printer or paper storage environment may be too humid or too dry. (As a result, paper may be too moist or too dry). Determine if this is the case and advise the customer. See “Moisture Content Field Test” (page 40).

Isolate a Paper Brand

If the printer jams with only one brand of paper:

- Try switching paper brands.
- If the paper ream being used appears to be old, open a fresh ream of the same paper and load it properly in to the printer. If the problem disappears, investigate storage and handling conditions.

NOTE: Care should be taken not to purchase more paper than can be easily used in a short time (about 3 months). Paper stored for long periods experiences heat and moisture extremes which can be damaging. Planning is important to prevent damage to a large supply of paper.

Hewlett-Packard neither warrants nor recommends the use of a particular brand of paper or print media. Media properties are subject to change by manufacturers and HP has no control over such changes. The customer assumes all responsibility for the quality and performance of media. Although testing media helps to characterize its performance, process quality control by the manufacturer and proper handling by the customer are both essential to ensure acceptable printing performance.

Isolate a Paper Type

When paper jams and other problems occur frequently, it is often because the customer is using a special paper. Customers must only use paper that conforms to all HP specifications, and should always test paper before purchasing large quantities. Paper should be tested before storage to verify quality printing results. Then, if problems arise in the future, storage or handling conditions will be the most likely cause. Some types of media that may cause problems are:

- Pre-printed forms and special letterhead
- Embossed paper
- Perforated paper
- Adhesive labels
- Envelopes
- Transparencies
- Chemically treated paper
- Synthetic paper
- Coated paper
- Other special media

Pre-printed Forms and Special Letterhead

Many pre-printed forms and special letterhead papers perform well in HP LaserJet printers. However, these papers undergo processes that alter their original characteristics and care must be taken to ensure they conform to HP specifications. All special papers should be wrapped in moisture-proof wrapping when purchased from the paper converter or printing house.

Forms and letterhead must be printed with inks that conform to the following specifications:

- Only use ink that is heat-resistant, and will not melt, scorch, or release hazardous emissions when subjected to 200C/392F for 0.1 second.

NOTE: Do not use low-temperature inks (the kind used with thermography).

- Inks must have resistance to silicon oils, and must not be affected by resin components in toner.
- Inks must not be flammable.
- Inks must not “offset” (transfer from the printed paper onto the printer, contaminating internal printer components). The principle cause of offset is ink which is not fully dried or which cannot withstand the printer fusing temperature.

Embossed paper

Embossed paper is not recommended for use in HP LaserJet printers. Paper is embossed by stamping an image into the paper compressing the fibers together at approximately 200 degrees C (392 degrees F), sometimes applying a thin metal foil to the surface. The fusing process can loosen the foil; stray foil may then interfere with the electronics and cause problems with the printer.

Embossed paper, with or without foil, may also cause multi-feed paper jams, as the sheets tend to stick together.

Paper with Cutouts or Perforations

Paper with cutouts or perforations should be avoided for three reasons:

1 The cut fibers absorb more moisture and can increase waviness and paper curl. This decreases the print quality near the cutout or perforated area.

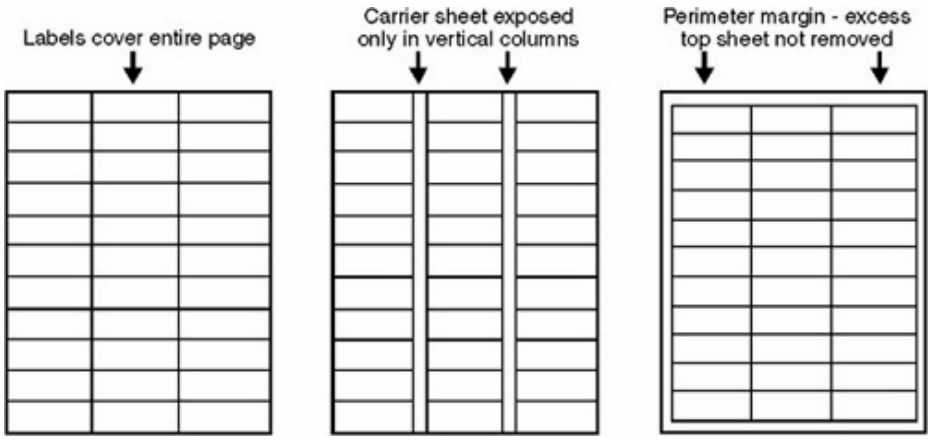
2 The cutting knife leaves a sharp edge on the cutout or perforation. If this sharp edge is facing the toner cartridge drum during printing, it can scratch the drum surface if used frequently.

3 If printing occurs over a cutout hole. the transfer corona or transfer roller is contaminated with unused toner. Light streaks can develop on the paper in the direction of paper motion from the contaminated corona or roller.

Adhesive Labels

Labels are defined as paper with a pressure-sensitive adhesive backing. Label stock includes the top sheet, the adhesive, and the carrier sheet, also referred to as the backing. If available, the rear output tray should always be used when printing on labels. To prevent paper jams and feed problems, labels must:

- be cut long grain (as opposed to short grain). See “Grain Field Test” (page 40)
- totally cover the carrier sheet (no spaces between the labels)
- contain no excessive glue. (Adhesive from some labels can cause jamming due to buildup anywhere throughout the printer mechanism. The adhesive should be acrylic-based emulsion and should not come into direct contact with the printer at any time.)
- meet HP specifications for fusing compatibility. See “Fusing Compatibility Field Test” (page 42)
- meet HP specifications for caliper. See “Caliper Field Test” (page 39)
- have a carrier sheet that is not too smooth (can cause the feed rollers to slip)


Labels cover entire page
Carrier sheet exposed only in vertical columns
Perimeter margin - excess top sheet not removed

Envelopes

It is difficult to specify types of envelopes that will work on HP LaserJet printers, because of the variety of folds and cuts available. It is very important to test a sample envelope before purchasing a large quantity. The specifications that apply to paper also apply to envelopes. Contact adhesives should be avoided. Following are a few recommendations for feeding envelopes:

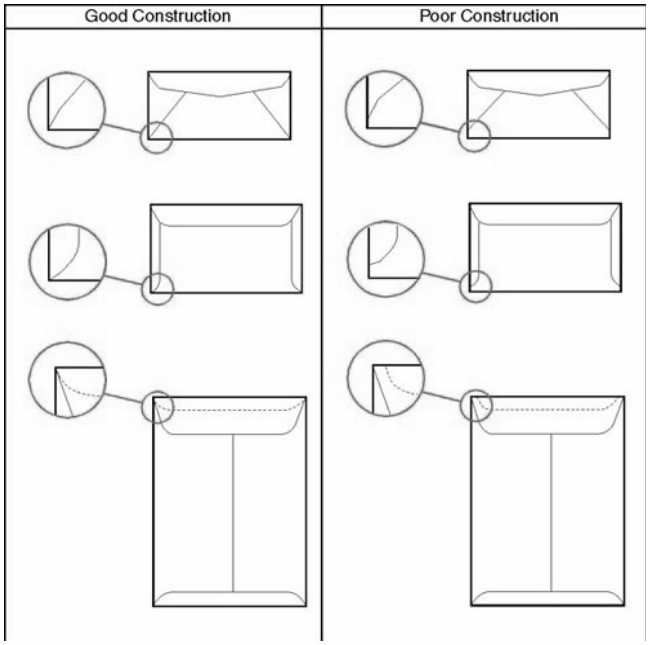
- Closely inspect the leading edge of the envelopes prior to feeding them into the printer. Ensure the leading edge is flat. Watch for envelope curl and “dog ears”. If necessary, flatten the leading edge of the envelope prior to feeding.
- Be patient! In manual feed mode, if the printer displays a message when the printer is ready to accept the next envelope, always wait for this message to appear without rushing envelopes through the printer.
- Do not allow a large quantity of envelopes to accumulate in the output tray. If too many envelopes are allowed to accumulate they can interfere with the output path.
- If available, use a rear output tray when printing envelopes.

The main causes of problems with envelopes on HP LaserJet printers are:

- folds (two or more thicknesses of paper),
- edge creases (sharp or rounded),
- glued edges (sealing when fused),
- uneven printing surfaces.

Here are some guidelines to follow:

- Corner folds must be well-creased, with no more than two thicknesses of paper.
- Envelopes must lay flat
- Paper grain should be diagonal.
- Adhesives must meet HP specifications for fusing compatibility.
- Basis weight must not exceed 11 kg (24 lb.). See “Basis Weight Field Test” (page 38).
- Under no circumstances should envelopes have clasps, snaps, windows, or use synthetic materials. Severe damage to the printer may result.



Transparencies

Printing on transparencies presents a special set of challenges. The surface resistance of a transparency can be infinite, causing the transparency to act like paper with 0% moisture content. This may resulting in streaks and smudging. Static charges may accumulate on some transparent stock and cause multifeed jams. Also, certain brands and types of transparencies will not tolerate exposure to the fuser.

The user should only select transparencies that meet HP specifications. Among the common precautions are:

- Print transparencies to the top output bin to avoid jams.
- Transparencies must have correct resistivity (not build up static charge). See “Transparency Specifications” (page 36).
- Transparencies must meet HP specifications for fusing compatibility.
- Each sheet should be removed from the tray and placed on a flat surface before printing the next sheet. This will keep the toner form rubbing off onto the next sheet before it has had time to cool.

Chemically Treated Paper

Coatings such as lacquers, polymers, laminations, or other chemicals protect the paper but can cause problems in the fuser and transfer areas of HP LaserJet printers. The surface resistivity and moisture content can be greatly altered, resulting in print quality problems. Hard surface coatings increase wear on the rollers and paper guides. All chemically treated paper must meet HP specifications for fusing compatibility.

Synthetic Paper

Synthetic papers (those manufactured from man-made fibers) do not perform as well as bond papers in any printer, especially HP LaserJet printer. All synthetic papers must meet HP specifications, especially for caliper and fusing compatibility. See “General Media Specifications” (page 28).

Coated Paper

Do not use coated paper. Most coated paper does not meet specifications for fusing compatibility and other specifications for HP LaserJet printers.

Other Special Media

1 Odd sizes - check minimum and maximum supported sizes in “Operating Requirements” (page 25).

2 Carbonless paper - Carbonless paper (NCR) is not supported by HP LaserJet printers.

3 Recycled Paper - Choose recycled paper that meets HP specifications. Note that recycled paper may not be a bright as indicated in the specifications. HP recommends that recycled paper contain no more than 5% groundwood.See “Furnish (Fiber Composition) Field Test” (page 41) for testing information.

Evaluate Paper User Practices

Handling and Loading

Often differences in techniques, missed steps, or paper handling methods are responsible for common paper problems. Be sure the paper is loaded correctly in the printer.

NOTE: Ensure that all printer users are observing these guidelines

Printer Maintenance

General cleanliness of the printer is the most important part of printer maintenance. Printers using papers that create a lot of dust and debris may require an aggressive maintenance schedule. Paper dust accumulates in the following areas:

- pick-up rollers
- paper guides
- transfer corona (older HP LaserJet printer models

Take extra time to clean and inspect the paper path. If problems continue after cleaning, inspect for wear or damage.

Paper Stacking

Consider the following guidelines when advising the customer about stacking paper:

- Do not store cartons of reams directly on the floor; cartons should be placed on a pallet or on shelves.
- Do not stack more than six cartons high.
- Stack each carton squarely on top of the other.
- Stack each carton upright.
- Do not store individual reams in such a manner that they will curl or warp along the edges.
- Do not place anything on top of paper.
- Do not place paper close to heating or air conditioning vents or open windows.

Evaluate Environmental Conditions

Printing Environment

Ideally, the printing environment should be at or near room temperature, and not too dry or too humid. Paper absorbs and loses moisture rapidly.

Temperature extremes work with humidity to damage paper. Heat causes the moisture in paper to evaporate; cold causes it to condense on the sheets. Heating systems and air conditioners remove most of the humidity from a room; humid weather or water coolers can cause the humidity to increase. As paper loses moisture, streaks and smudging result. As paper absorbs moisture, light print and dropouts result.

Paper Storage Environment

Paper storage and handling is as important as the paper-making process itself. Paper storage environmental conditions directly affect the feed operation.

NOTE: Care should be taken not to purchase more paper than can be easily used in a short time (about 3 months). Paper stored for long periods may experience heat and moisture extremes which can cause damage. Planning is important to prevent damage to a large supply of paper.

Unconverted paper in sealed reams can remain stable for several months before use. Converted papers have more potential for environmental damage, especially if they are not wrapped with a moisture-proof barrier.

The paper storage environment should be properly maintained to ensure optimum printer performance. The required condition is 68 to 75 F (20 to 24 C), with a relative humidity of 45% to 55%. The following guidelines should be considered when evaluating the customer's paper storage environment:

- Paper should be stored at or near room temperature.
- The air should not be too dry or too humid.
- The best way to store an opened ream of paper is to re-wrap it tightly in its moisture-proof wrapping. If the printer environment is subject to extremes, unwrap only the amount of paper to be used during the day's operation to prevent unwanted moisture changes.

Communication Troubleshooting

This section provides an overview of the printer's interface requirements.

Communications Check

NOTE: Communication problems are normally the customer's responsibility. Time spent attempting to resolve these problems may not be covered by the product's Hewlett-Packard warranty.

Refer the customer to the network administrator for assistance in troubleshooting network problems.

Test Message

After the printer is installed, verify communications between the printer and the IBM-compatible computer. Enter the following at the DOS prompt:

`C:\DIR>LPT1` ENTER (for printing to parallel port #1)

The printer should print a directory listing of the C: \ directory.

EIO Troubleshooting

See the "JetDirect Configuration Page" (page 140) for information regarding the current status of the EIO accessories. Before attempting to troubleshoot a network problem or notifying the network consultant of a problem, always print a Configuration Page.

See the *HP JetDirect Print Server Software Installation Guide* for detailed explanations of network issues.

Figure 6-4 JetDirect Configuration Page

1 **General Information** provides general information about the printer's HP JetDirect print server, including the LAN HW address, I/O card status, and network statistics.

2 **Protocol Information** provides information and status about supported network protocols, including TCP/IP, SNMP, DLC/LLC, BOOTP/DHCP, Novel NetWare, and AppleTalk.

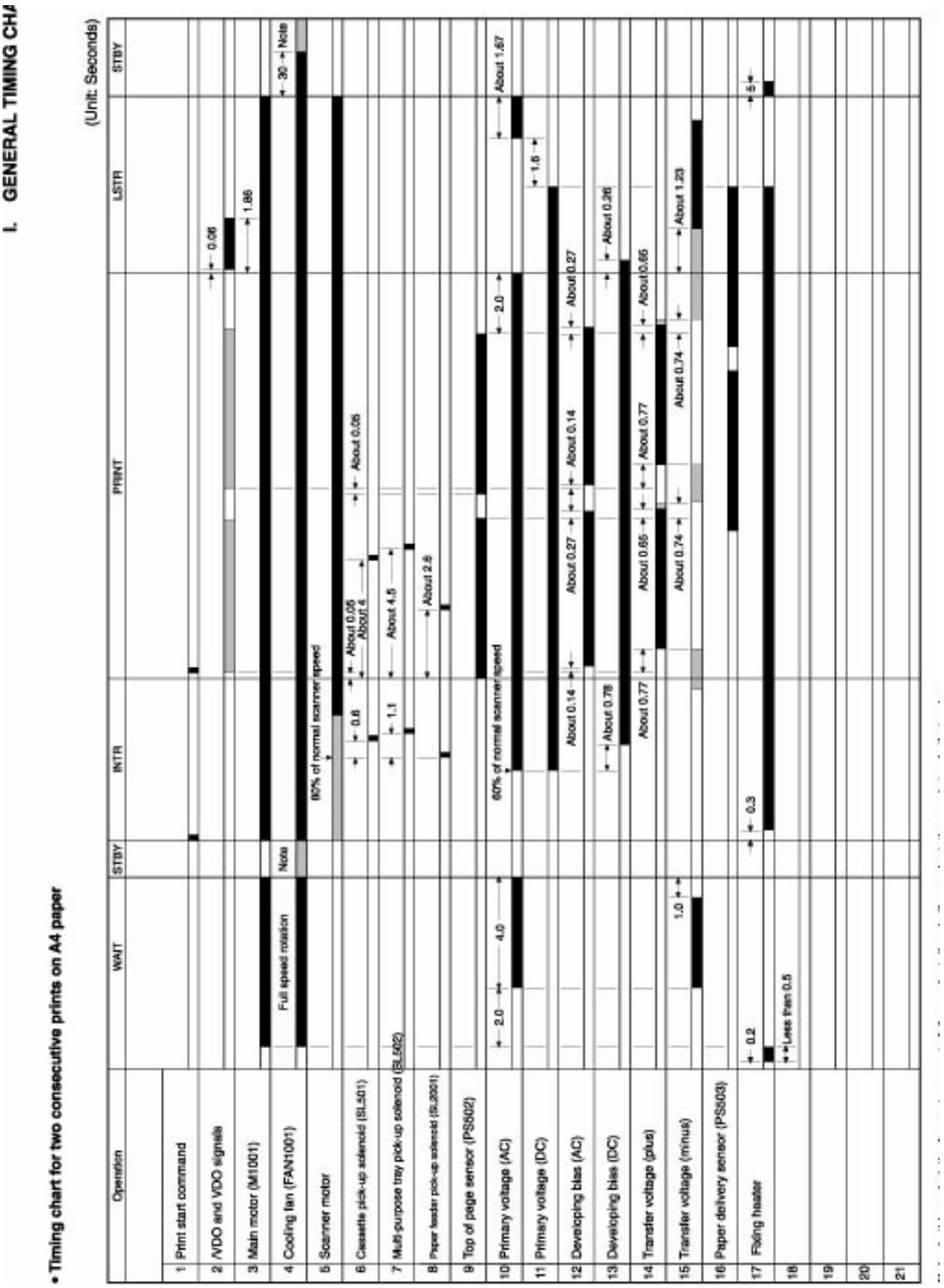
JetDirect Configuration

- If the EIO JetDirect Card has successfully powered up and completed its internal diagnostics, the I/O CARD READY message appears in the JetDirect Configuration Page. If communication is lost, an I/O NOT READY message appears followed by a two digit error code. See the *HP JetDirect Network Interface Configuration Guide* for further details and recommended action.
- The "Network Statistics" column indicates that network activity has been occurring. Bad packets, framing errors, unsendable packets and collisions should be minimal. If a high percentage (greater than one percent) of these occur, contact the network administrator. All of the statistics are set to zero when the printer is powered-off.
- The "Novell Status" block should state the Novell printer server name to which the printer is connected. If the node name reads "NPIxxxxxx" (xxxxxx=last six digits of the EIO's LAN address), the EIO card has not been configured for a Novell server. This could indicate that the card is operating under an IPX protocol other than Novell. Consult with the network administrator if the Node Name is not present.
- In the TCP/IP protocol block, the default IP address is "192.0.0.192." It is acceptable to operate the printer with this default address. The error message "ARP DUPLICATE ADDRESS" may appear in this block. This is also an acceptable error code if the TCP/IP protocol is not being used. Check with the network administrator to determine the correct IP Address for the printer.

Reference Diagrams

Timing Diagram

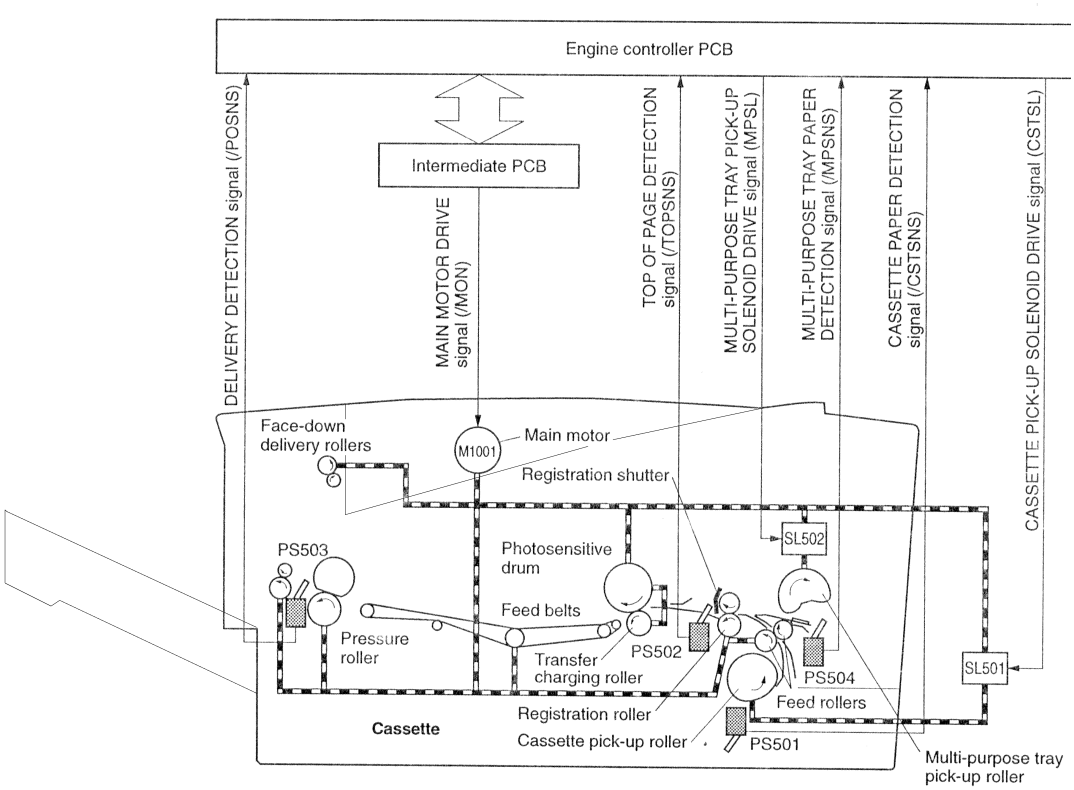
Figure 6-5 Timing Diagram



Sensors and Signals

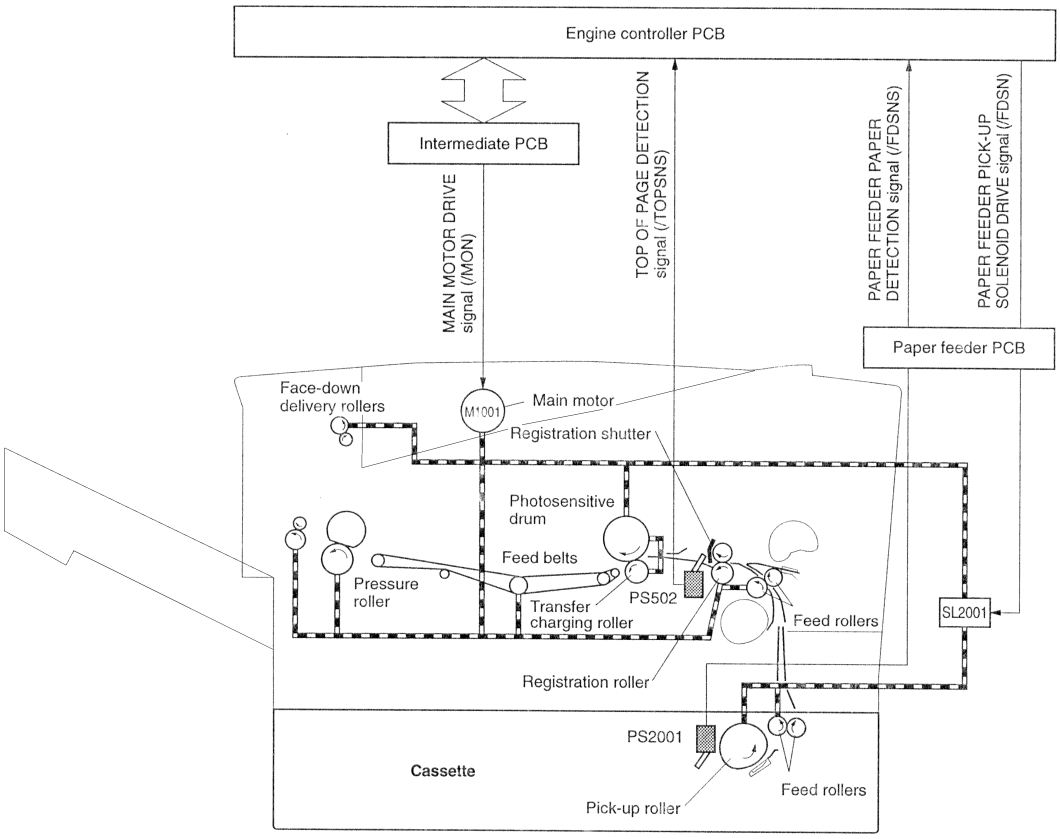
The drawings below show key components, sensors, and switches that control the operation of the printer.

Figure 6-6 Printer Paper Path, Sensors, and Signals



PS501: Cassette paper sensor
PS502: Top of page sensor
PS503: Delivery sensor
PS504: Multi-purpose tray paper sensor
SL501: Cassette pick-up solenoid
SL502: Multi-purpose tray pick-up solenoid

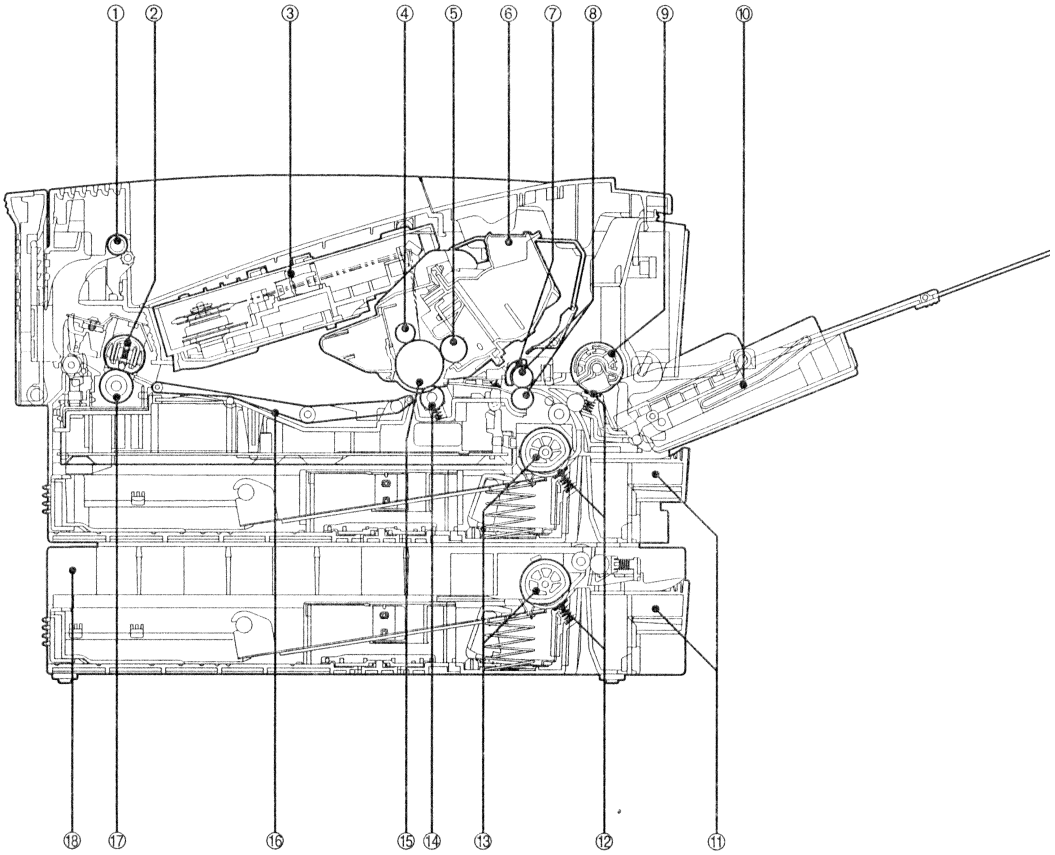
Figure 6-7 Optional Tray 3 Paper Path, Sensors, and Signal



PS502: Top of page sensor (Printer)
PS2001: Paper feeder paper sensor
SL2001: Paper feeder pick-up solenoid

Component Locations

Figure 6-8 General Printer Component Locations



1: Delivery roller
2: Fixing film unit
3: Laser/scanner unit
4: Primary charging roller
5: Developing cylinder
6: EP-32 cartridge
7: Registration shutter
8: Registration roller
9: Multi-purpose tray pick-up roller
10: Multi-purpose tray
11: Cassette
12: Separation pad
13. Cassette pick-up roller
14: Transfer charging roller
15: Photosensitive drum
16: Feed belt
17: Pressure roller
18: Paper feeder (option)

Figure 6-9 Motor, Fan, PCB, and Solenoid Locations

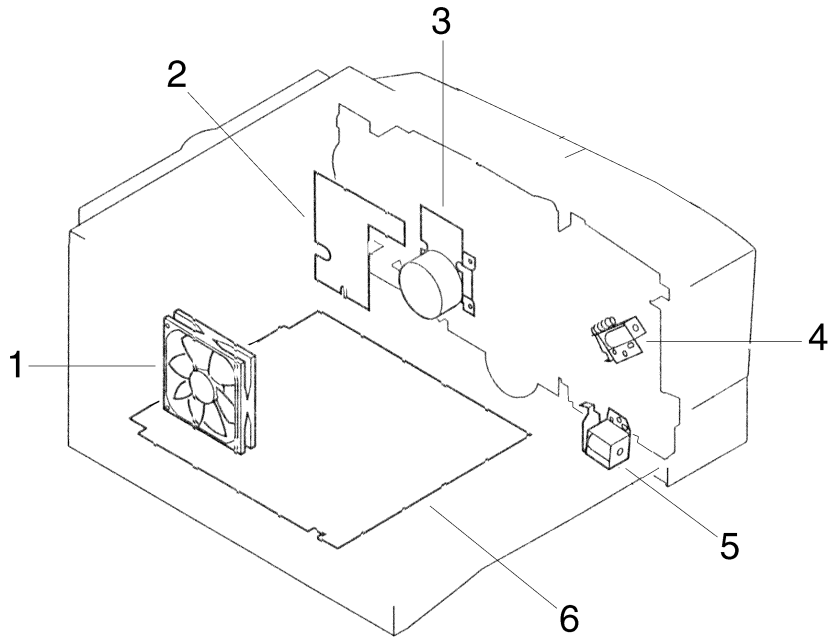
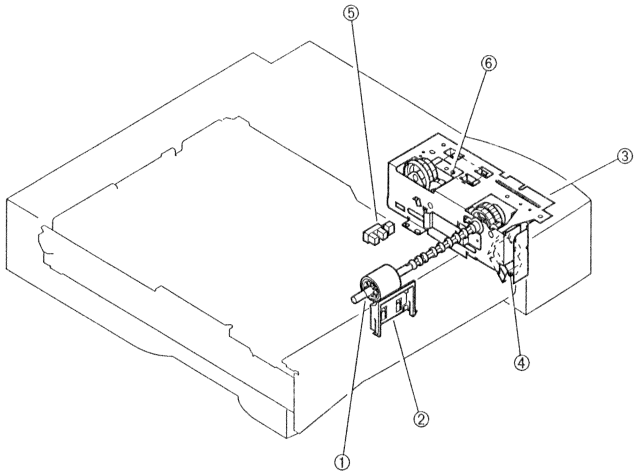


Table 6-10. Motor, Fan, PCB, and Solenoid Locations

Item	Description	Part Number
1	Cooling Fan	
2	Intermediate PCB	
3	Main Motor	
4	Tray 1 Pick-up Solenoid	
5	Tray 2 Pick-up Solenoid	
6	Engine Controller Assembly	

Figure 6-10 Optional tray 3 Component Locations



① Pick-up roller
② Separation pad
③ Pick-up drive unit
④ Pick-up solenoid
⑤ Paper sensor
⑥ Paper feeder PCB

Figure 6-11 Engine Controller Assembly LEDs, Test Pins, Jumpers, and Switches

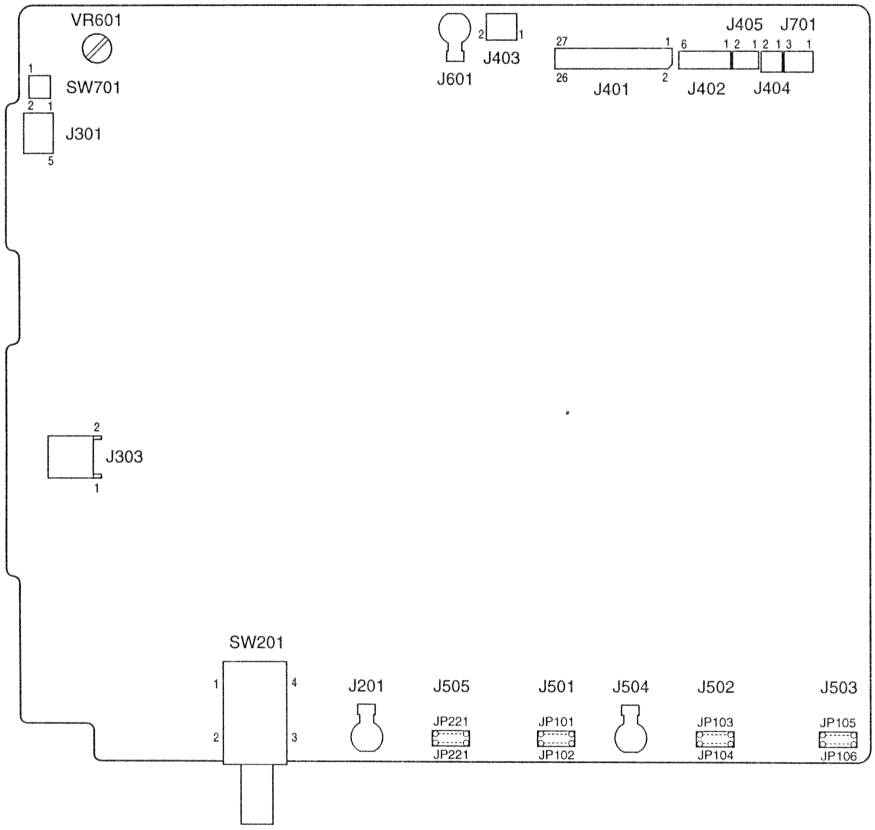


Figure 6-12 Location of Connectors (1 of 3)

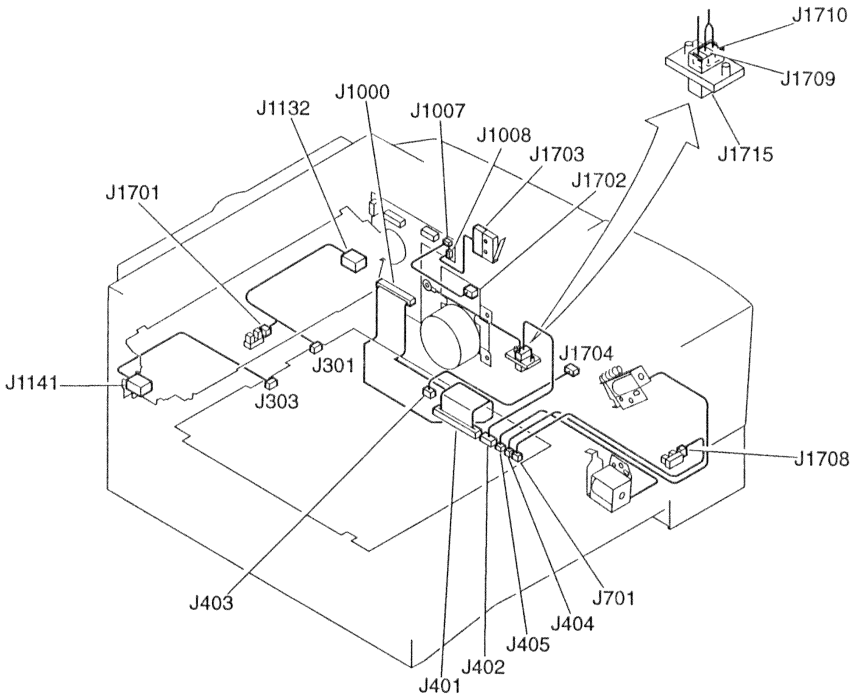


Figure 6-13 Location of Connectors (2 of 3)

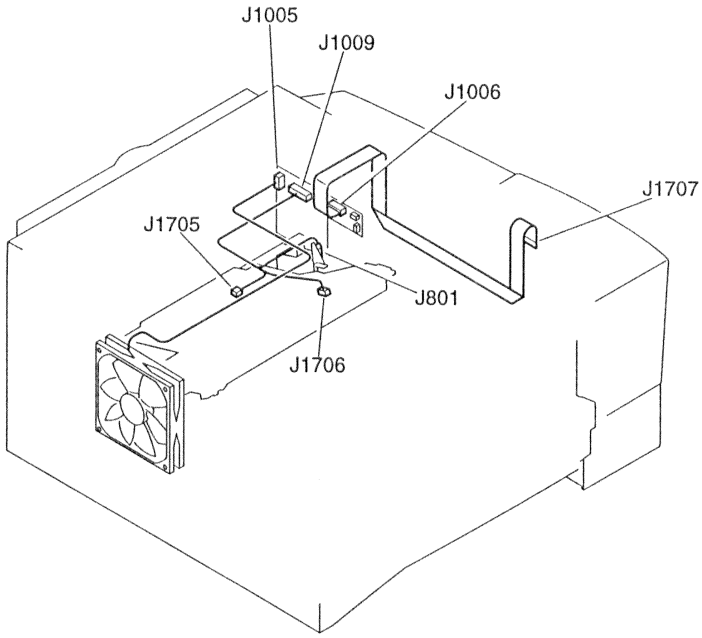
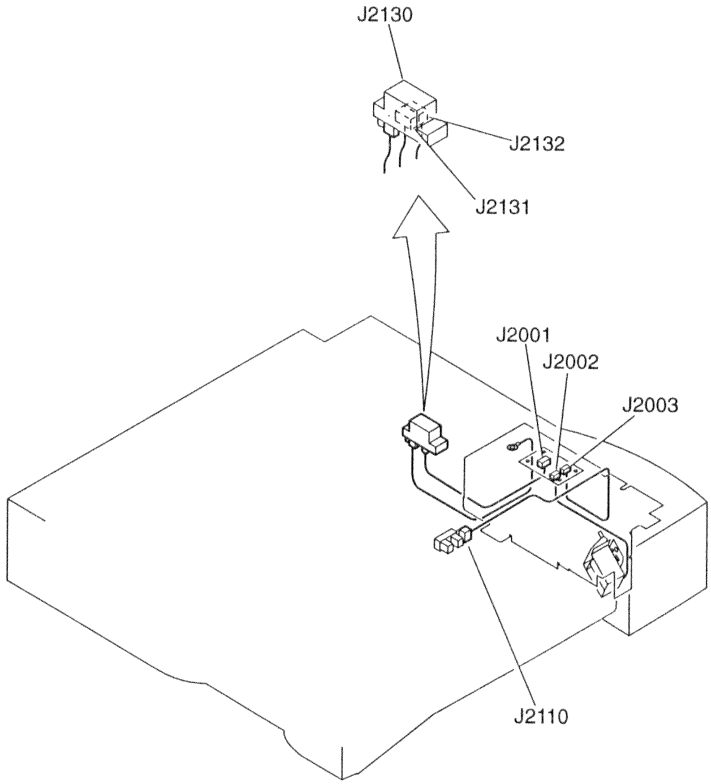


Figure 6-14 Location of Connectors (3 of 3)



7 Removal and Replacement

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Removal and Replacement Strategy

This chapter documents removal and replacement of field replaceable units (FRUs) only.

Replacement is generally the reverse of removal. Occasionally, notes are included to provide direction for difficult or critical replacement procedures.

WARNING!

To avoid serious injury, unplug the power cord from the power outlet before servicing the printer. Certain functional checks must be performed during troubleshooting with power supplied to the product. However, the power supply should be disconnected during disassembly.

Never operate or service the printer with the protective cover removed from the laser scanner assembly. The reflected beam, although invisible, can damage eyes.

The clip gasket which is attached to the Formatter's RFI Shield contains nickel. Repair technicians handling this gasket directly should wear gloves. Be advised per European Union Directive 76/769/EEC that ingestion of water soluble nickel salts can cause nausea, vomiting and diarrhea.

The printer may have sharp sheet metal edges. Exercise caution when working on the printer.

CAUTION:

The printer contains parts that are electrostatic discharge (ESD) sensitive. Always service it at an ESD-protected workstation or use an ESD mat.

To install a self-tapping screw, first turn it counterclockwise to align it with the existing thread pattern, then carefully turn clockwise to tighten. Do not overtighten. If a self-tapping screw-hole becomes stripped, repair the screw-hole or replace the affected assembly.

Always remove the toner cartridge before removing or replacing assemblies and parts.

Note the lengths, diameters, and locations of screws. Be sure to use them in their original locations during reassembly.

Required Tools

The following tools are required to perform the removal and replacement procedures listed in this chapter:

- #1 Phillips screwdriver with magnetic tip
- #2 Phillips screwdriver with magnetic tip
- Small flatblade screwdriver
- Needle nose pliers
- ESD mat

Parts Removal Tree

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Tray 2 Removal. 157
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Tray 2 Pickup Roller Removal 161
I/O Cover Removal 170
- EIO Card Removal 171

DIMM Cover Removal 172
- DIMM Removal 173
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    - Lower Output Delivery Roller Removal 194
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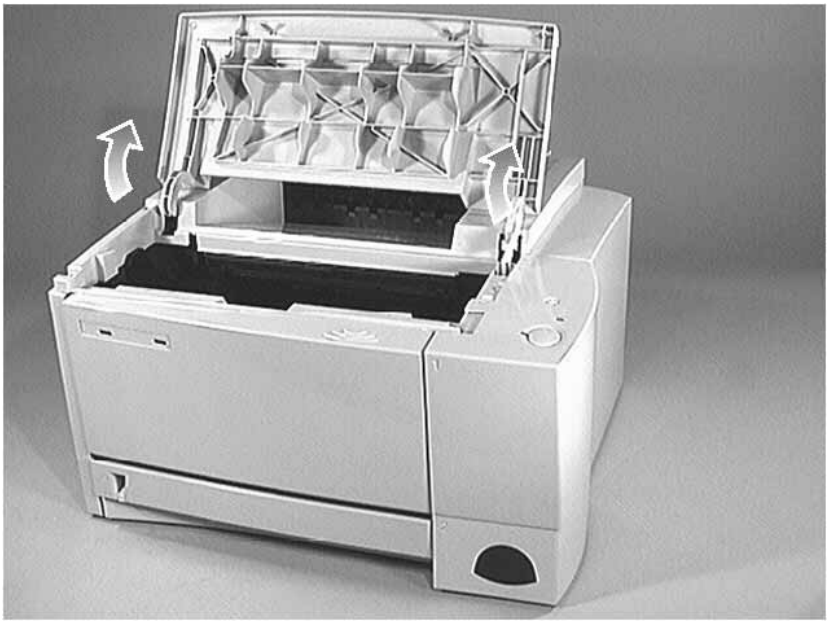
		Tray 3 Paper Feeder Drive Assembly Removal 249			
		Tray 3 Solenoid Removal 251			

Toner Cartridge Removal

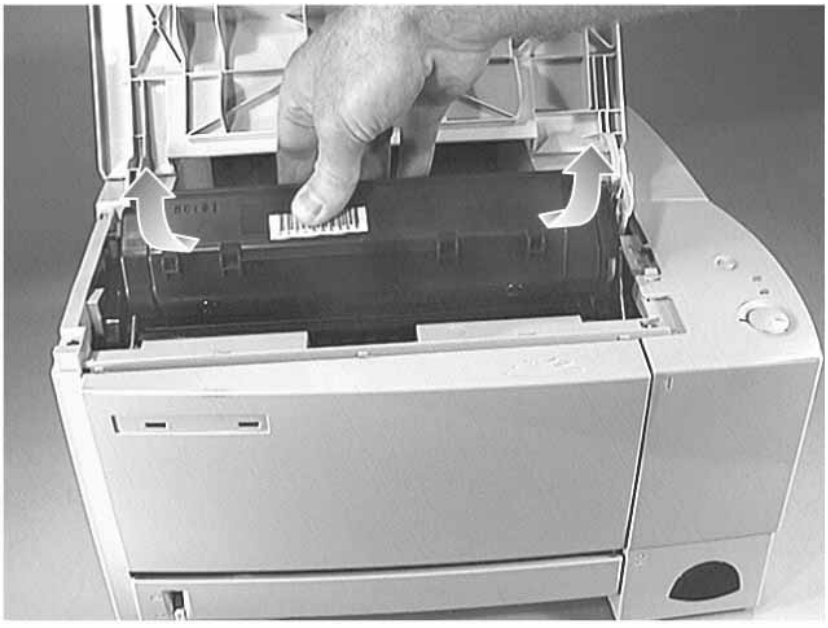
1 Open the toner cartridge door.

Figure 7-1 Opening the Toner Cartridge Door



2 Lift the toner cartridge and remove it.

Figure 7-2 Removing the Toner Cartridge



Tray 2 Removal

As shown in figure 7-3, pull out Tray 2 to remove it from the printer.

Figure 7-3 Removing Tray 2

Transfer Roller Removal

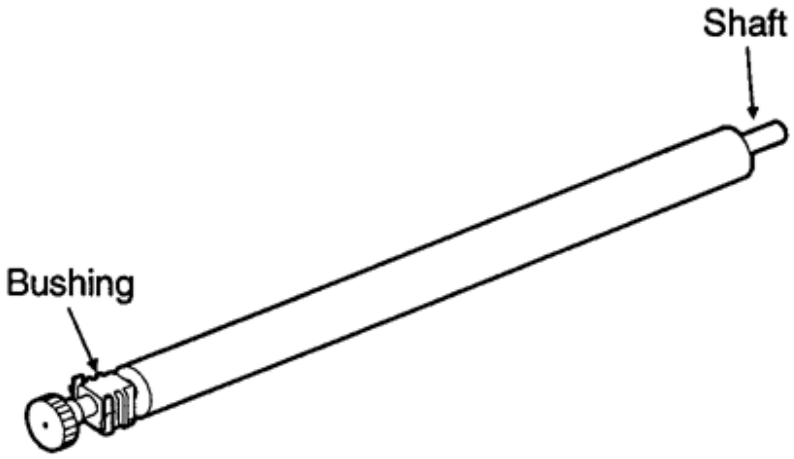
CAUTION: Do not touch the new transfer roller's sponge with bare skin because oils can damage the roller. Instead grasp the transfer roller's bushing and shaft.

1 Open the toner cartridge door.

2 Remove the toner cartridge. (See "Toner Cartridge Removal" (page 156) for instructions.)

3 Locate the transfer roller's black bushing, which is on the left end of the transfer roller's shaft and just behind the gear.

Figure 7-4 Transfer Roller's Black Bushing



4 Squeeze both of the black bushing's tabs (see figure 7-5), and then lift the transfer

roller's shaft to the left (see figure 7-6).

Figure 7-5 Removing the Transfer Roller (1 of 2)

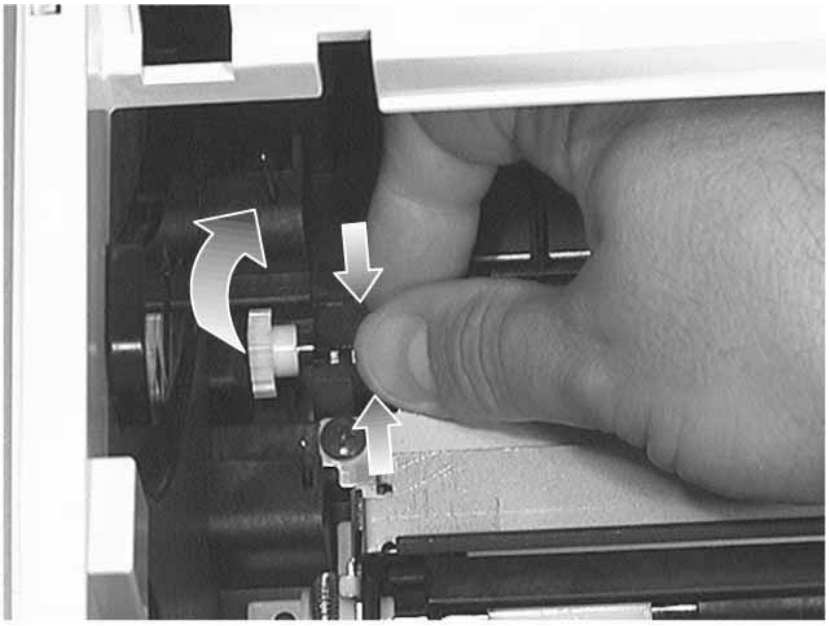
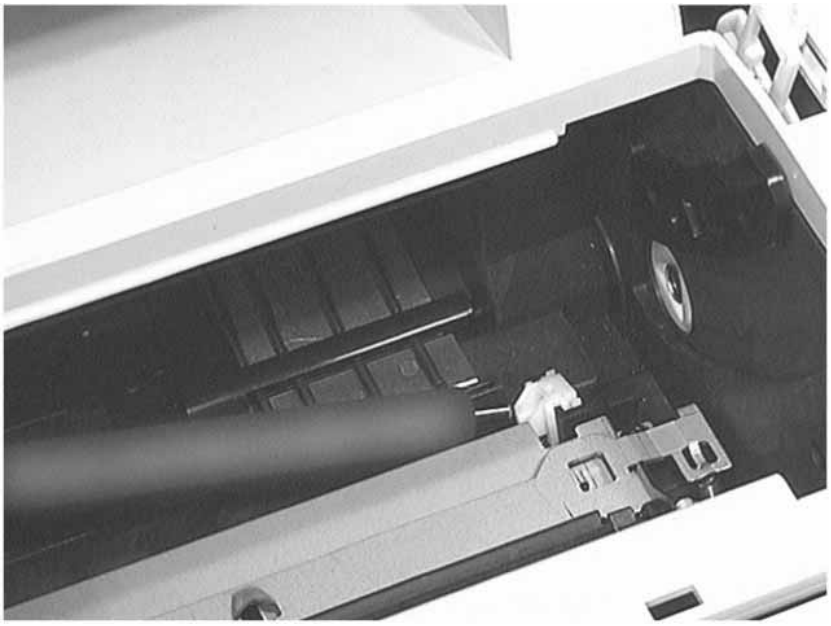


Figure 7-6 Removing the Transfer Roller (2 of 2)

NOTE: During replacement, securely insert the spring into the bushing's boss so that the bushing pushes on the spring when the transfer roller is set.

The white retaining clip on the right end of the transfer roller (see figure 7-7) is also field replaceable. To remove the retaining clip squeeze both tabs on the retaining clip, and then lift it up.

Figure 7-7 Other Field Replaceable Parts on the Transfer Roller



Tray 2 Pickup Roller Removal

Do not touch the pickup roller's sponge with bare skin.

1 If Tray 3 is installed, to remove it lift the printer off of the paper cassette assembly (see figure 7-8). Otherwise, go to step 2.

2 Remove the toner cartridge. (See section "Toner Cartridge Removal" (page 156) for instructions.)

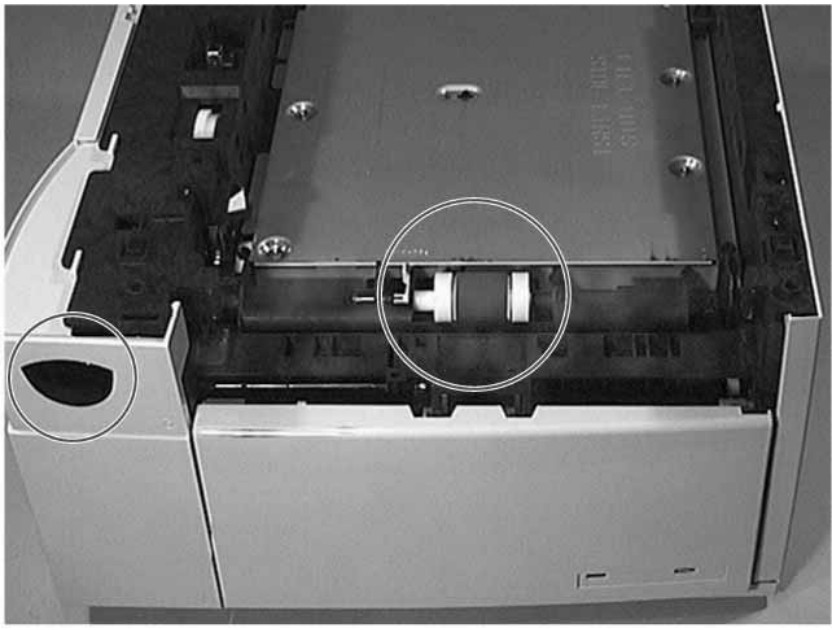
3 Remove Tray 2. (See section "Tray 2 Removal" (page 157) for instructions.)

Figure 7-8 Removing Tray 3

4 Place the printer top-down with the infrared port facing forward. Be careful not to scratch

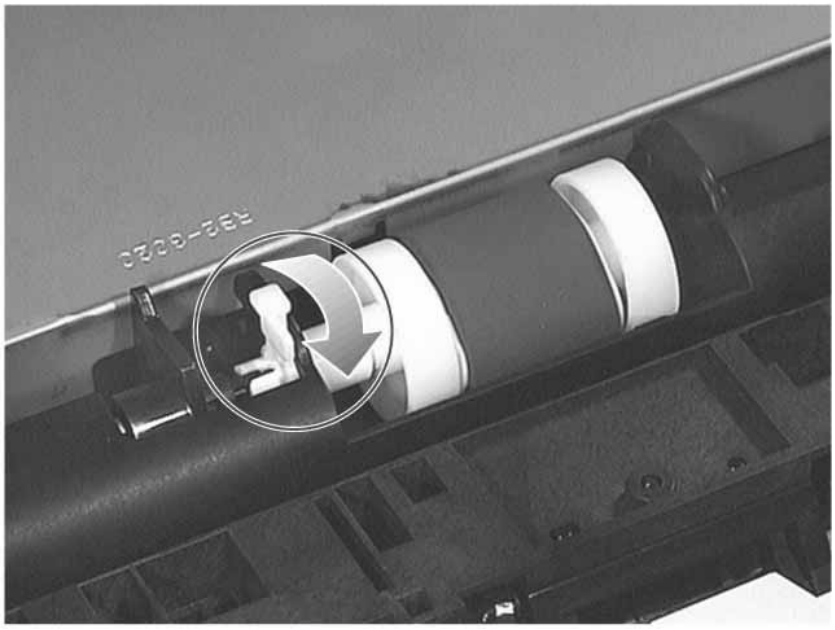
the printer or the surface.

Figure 7-9 Accessing Tray 2 Pickup Roller



5 Tilting the lever to the left, rotate the white bushing as shown in figure 7-10. Stop when the bushing's tab is aligned with the opening on the carriage.

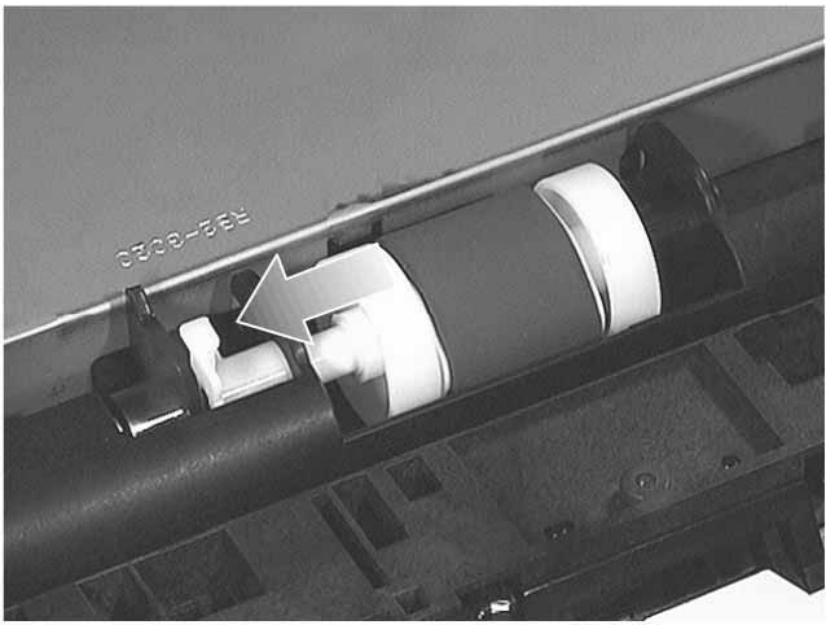
Figure 7-10 Rotating the White Bushing



6 Align the bushing's tab with the opening on the carriage, and then slide the white

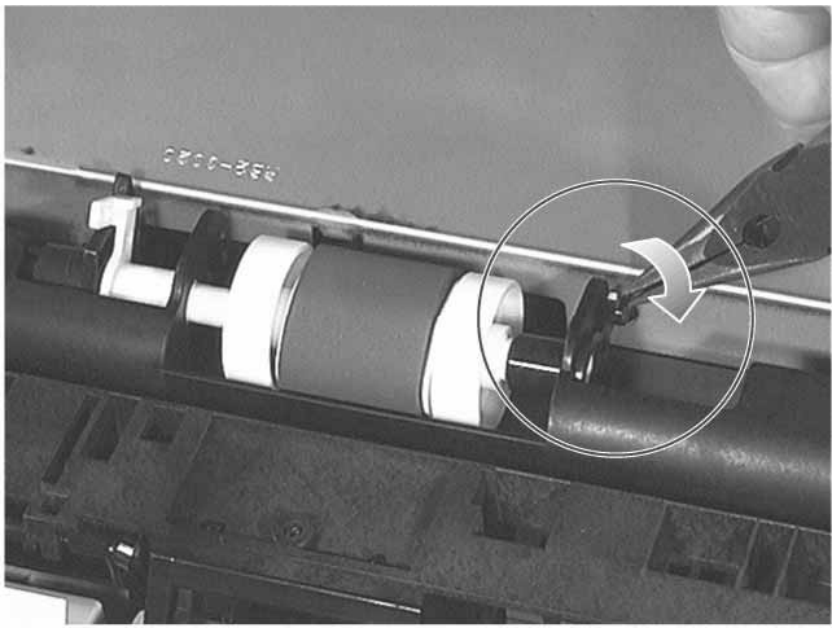
bushing to the left.

Figure 7-11 Sliding the White Bushing to the Left



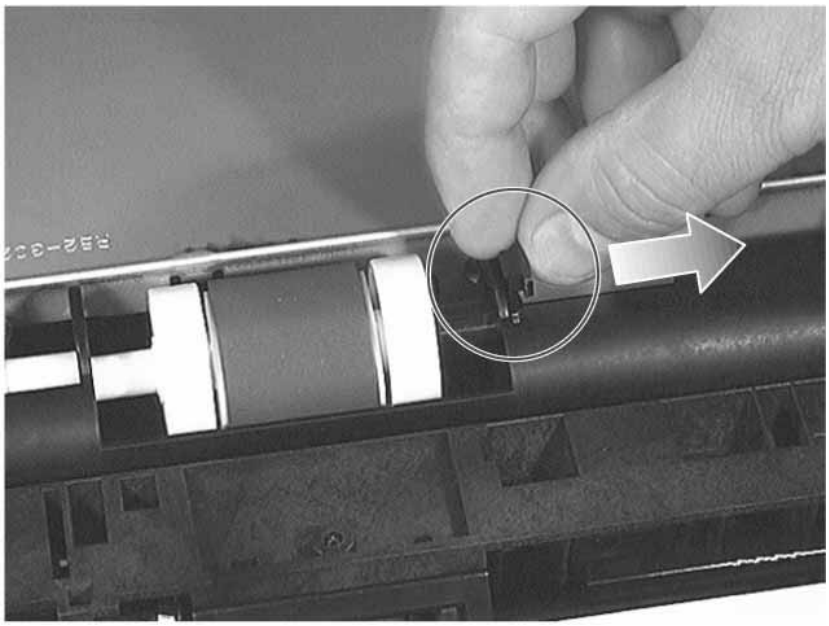
7 Tilting the lever to the right, rotate the black bushing as shown in figure 7-12. If necessary, grasp the bushing's lever with the needle nose pliers.

Figure 7-12 Rotating the Black Bushing



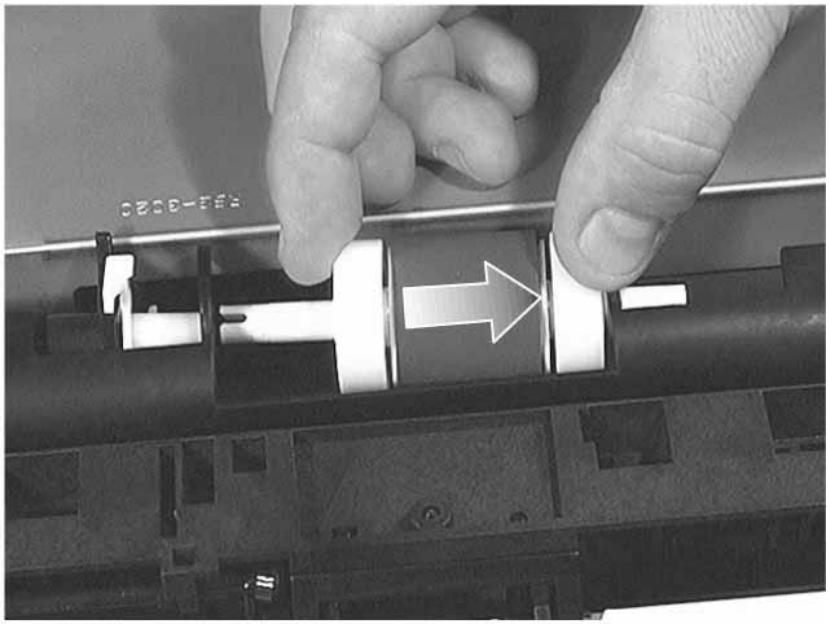
8 Remove the black bushing from the pickup roller's shaft.

Figure 7-13 Removing the Black Bushing



9 Slide the pickup roller to the right so that its shaft is removed from the white bushing.

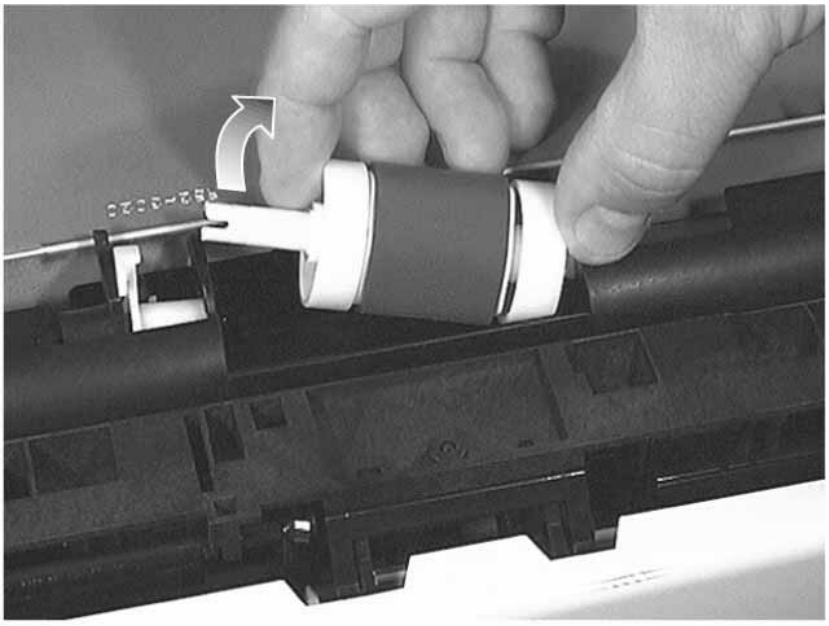
Figure 7-14 Removing the Pickup Roller Shaft from the White Bushing



10 To remove the pickup roller from its carriage grasp the left end of its shaft and then lift up

the roller.

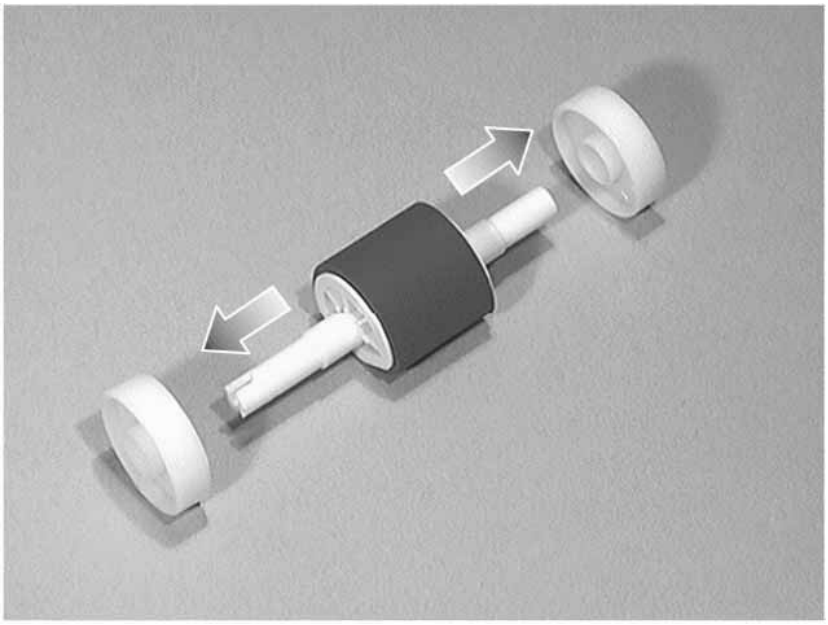
Figure 7-15 Removing the Pickup Roller



Tray 2 Pickup Roller Replacement

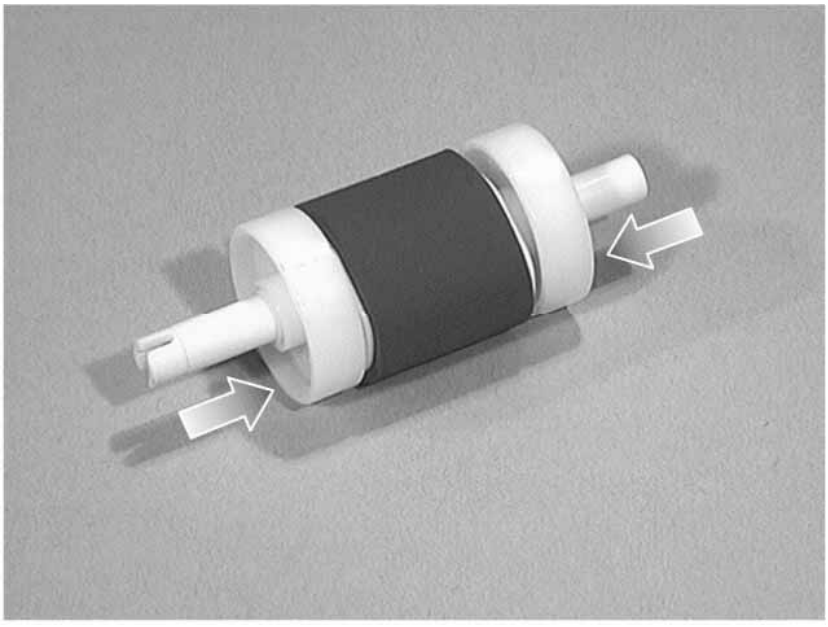
1 Remove the two rollers from the pickup roller.

Figure 7-16 Removing the Two Rollers



2 Place the two rollers on the ends of the new pickup roller.

Figure 7-17 Replacing the Two Rollers

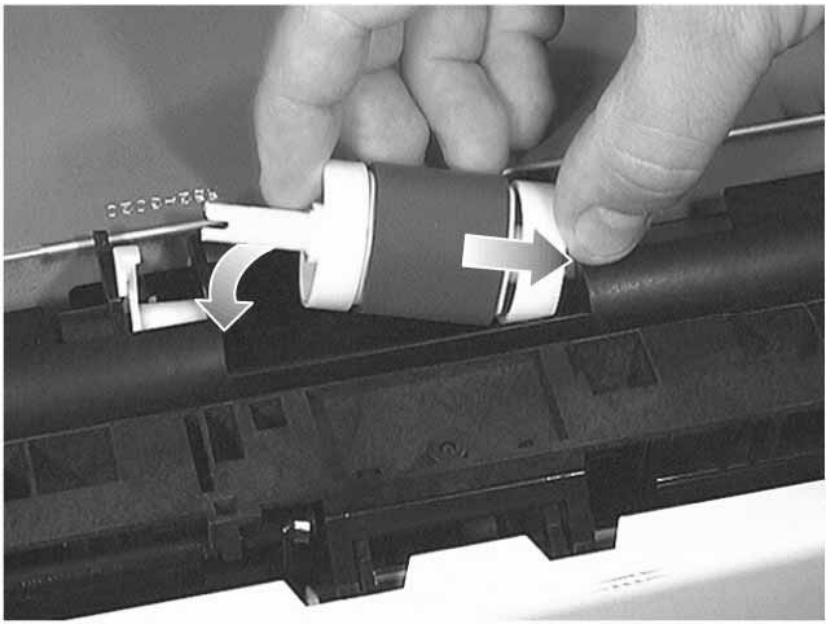


3 Replace the pickup roller in its carriage as follows:

a Insert the non-slotted end of the roller's shaft through the right-side carriage opening while holding the roller at a slight angle.

b Lower the other end of the pick-up roller until it rests on the bottom of the carriage.

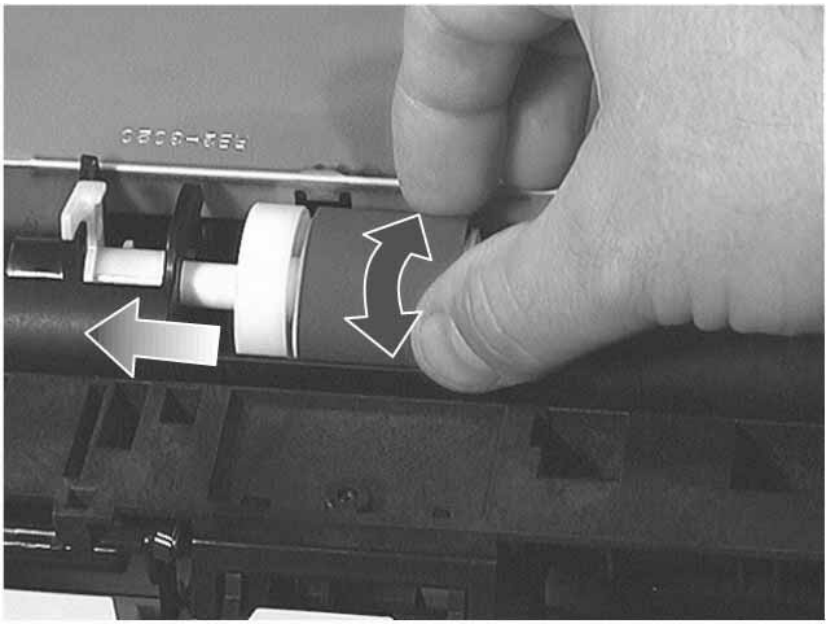
Figure 7-18 Replacing the Pickup Roller



4 Slide the slotted end of the pickup roller's shaft into the white bushing. Rotate the roller while sliding it so that its slotted shaft rests over the drive shaft.

The black bushing will not fit if the slotted end of the pickup roller's shaft is not properly inserted over the drive shaft.

Figure 7-19 Inserting the Pickup Roller back in the White Bushing

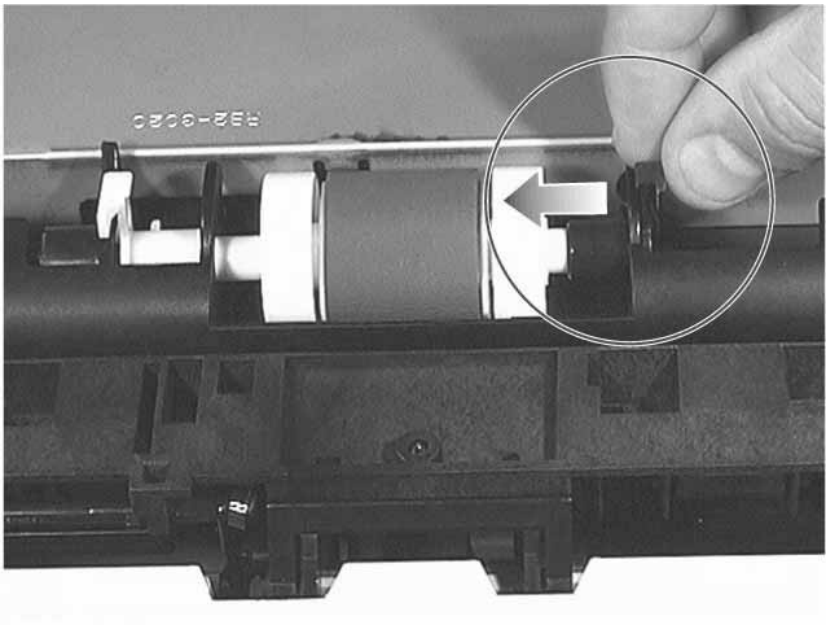


5 Slide the black bushing through the carriage opening and over the non-slotted end of the pickup roller's shaft.

The tab on the black bushing must be oriented so that it will fit through the keyed opening on the carriage. If the black bushing does not fit, the slotted end of the pickup

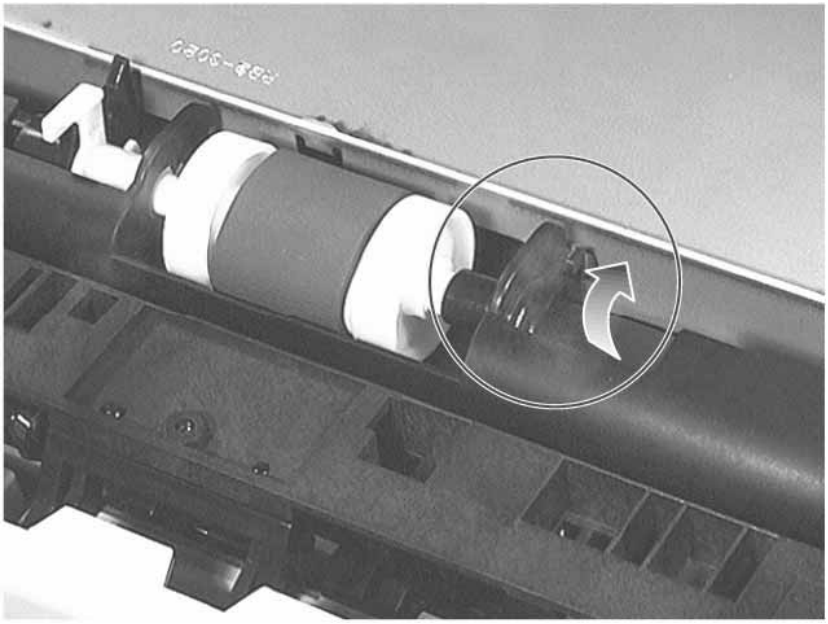
roller's shaft is not properly inserted over the drive shaft. If necessary, repeat step 4.

Figure 7-20 Replacing the Black Bushing



6 Rotate the black bushing forward until it locks in place.

Figure 7-21 Locking the Black Bushing in Place

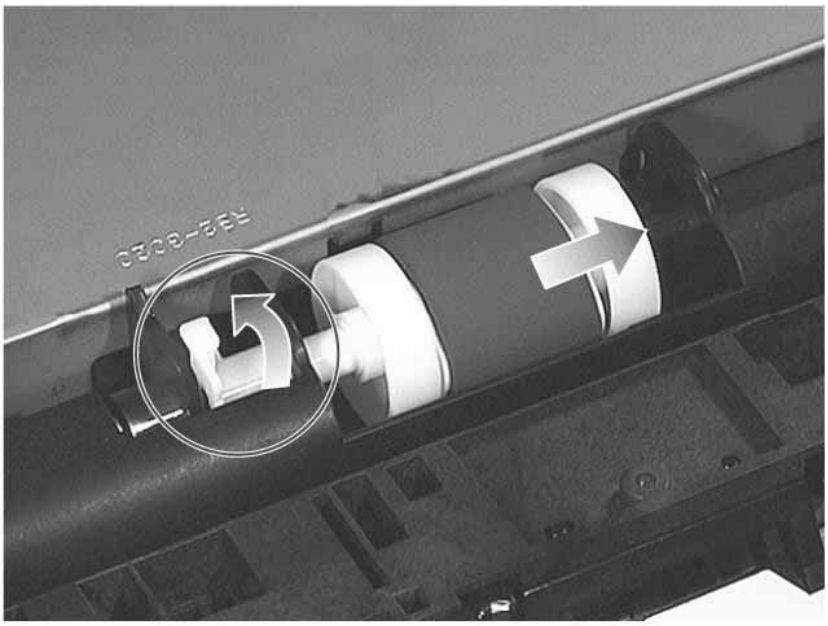


7 Slide the white bushing to the right until it goes through the carriage opening (see figure 7-22). The tab on the white bushing must be oriented so that it will fit through the keyed opening on the carriage.

8 Rotate the white bushing forward until it locks in place.

9 Turn the printer upright and install the toner cartridge and any removed paper trays.

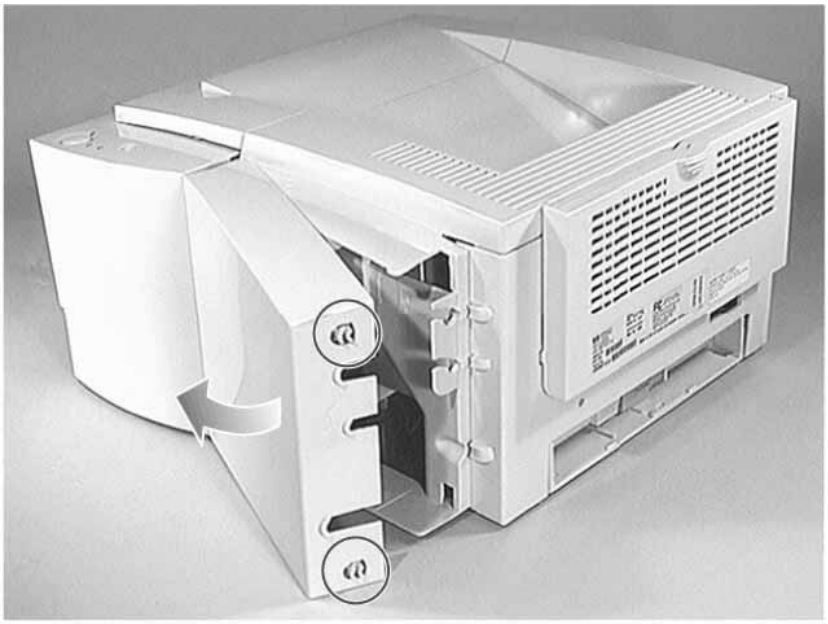
Figure 7-22 Replacing the White Bushing



I/O Cover Removal

Pushing the two tabs on the back of the I/O cover (see figure 7-23), swing the I/O cover as shown in figure 7-23.

Figure 7-23 Removing the I/O Cover



EIO Card Removal

1 Remove the I/O cover. (See “I/O Cover Removal” (page 170) for instructions.)

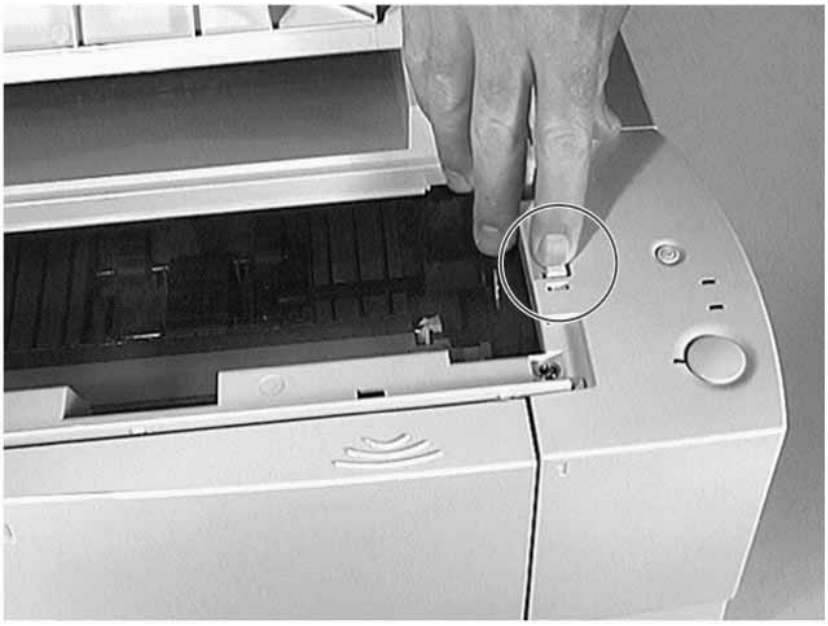
2 Pull out the EIO card to remove it.

DIMM Cover Removal

1 Open the toner cartridge door.

2 Press and hold the release button shown in figure 7-24.

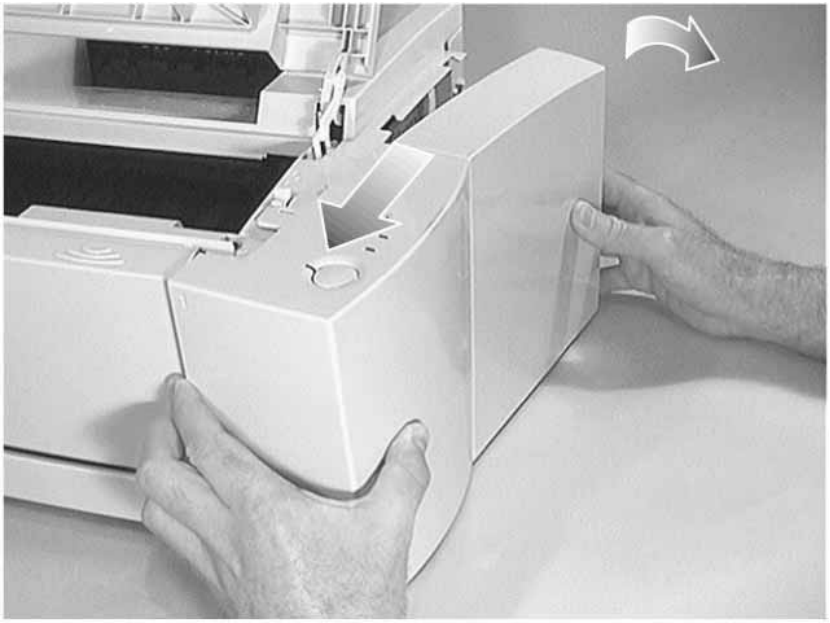
Figure 7-24 DIMM Cover Release Button



3 Grasp the rear of the cover and pull it away from the printer until it stops.

4 Grasp the front and rear of the cover and swing it out from the printer.

Figure 7-25 Removing the DIMM Cover

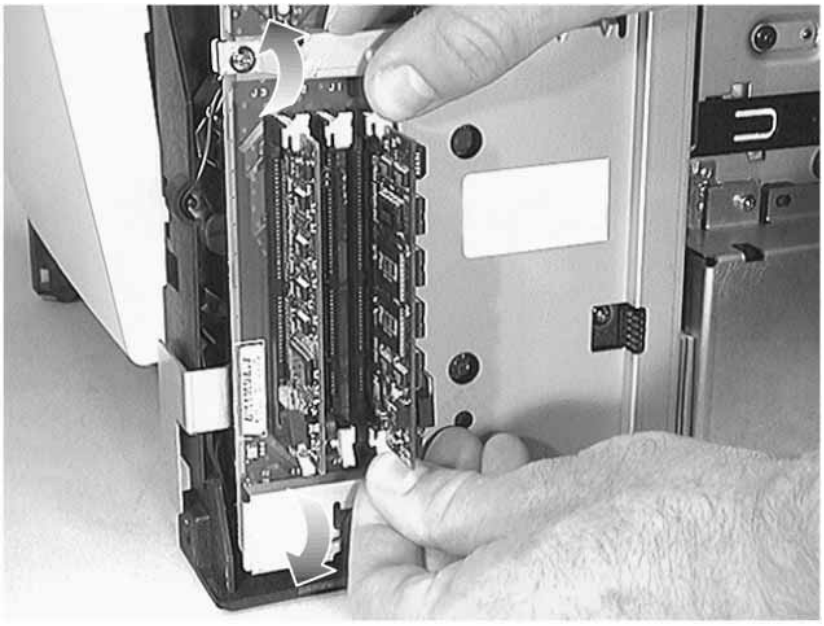


DIMM Removal

1 Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)

2 Rotate the levers shown in figure 7-26 outward to remove the DIMM.

Figure 7-26 Removing a DIMM



Formatter PCB Removal

1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- If the EIO Card is installed, remove it. (See “EIO Card Removal” (page 171) for instructions.)

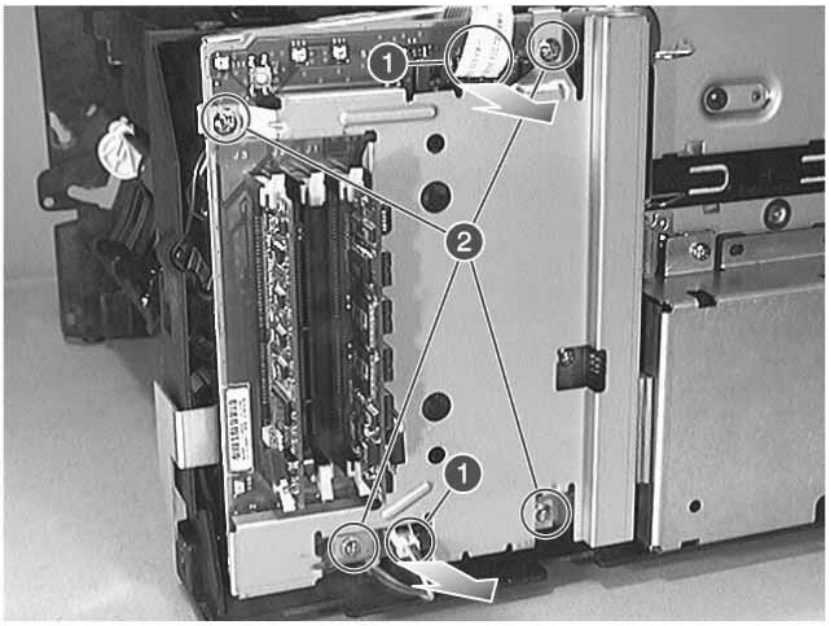
2 Disconnect the ribbon and power cables shown in figure 7-27.

3 Remove the four screws shown in figure 7-27.

WARNING! The clip gasket which is attached to the Formatter's RFI Shield contains Nickel. Repair technicians handling this gasket directly may wish to wear gloves. Be advised per European Union Directive 76/769/EEC that ingestion of water soluble nickel salts can cause nausea, vomiting and diarrhea.

4 Remove the sheet metal RFI shield.

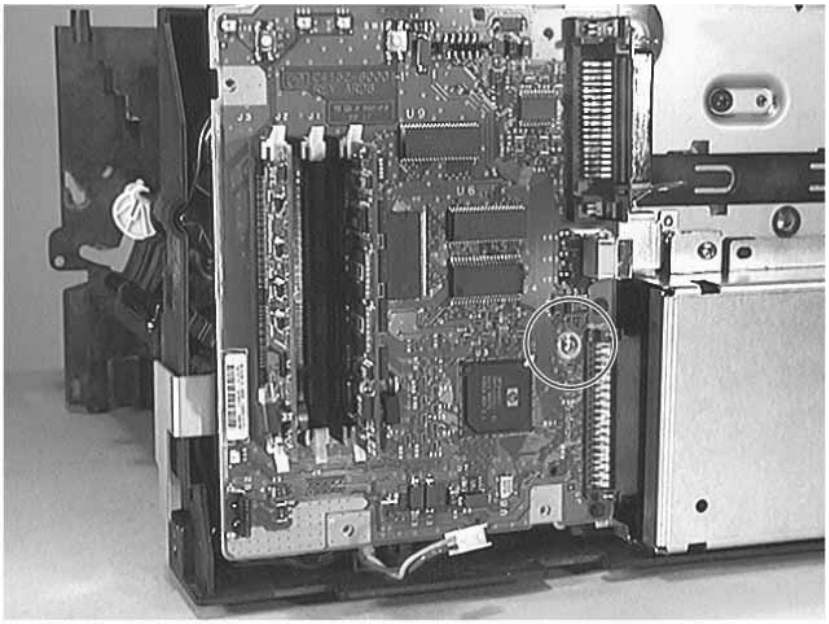
Figure 7-27 Disconnecting Cables and Removing Screws



5 Remove one screw as shown in figure 7-28.

6 Remove the formatter PCB.

Figure 7-28 Removing the Formatter PCB



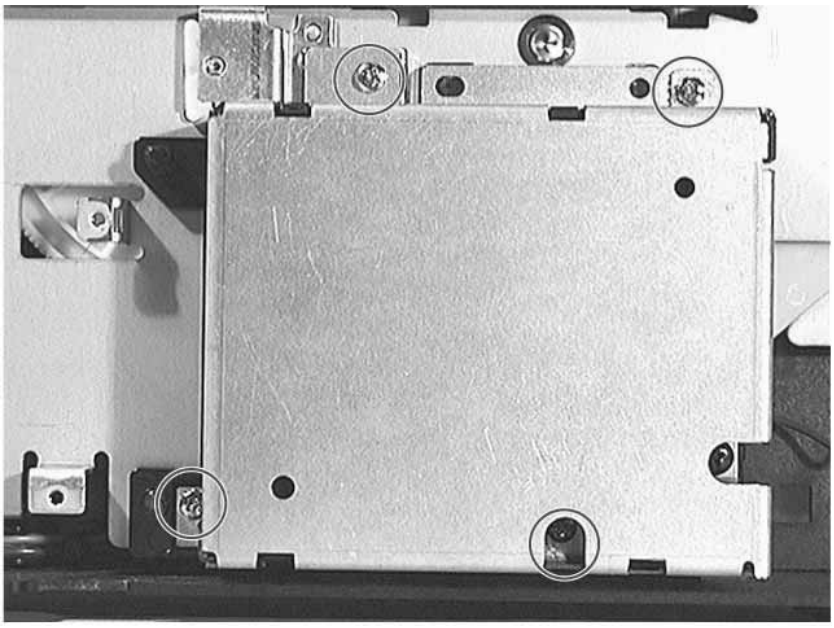
EIO Shield and Guide Removal

1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the formatter PCB. (See “Formatter PCB Removal” (page 174) for instructions.)

2 Remove the four screws shown in figure 7-29 to remove the shield.

Figure 7-29 Removing EIO Shield and Guide

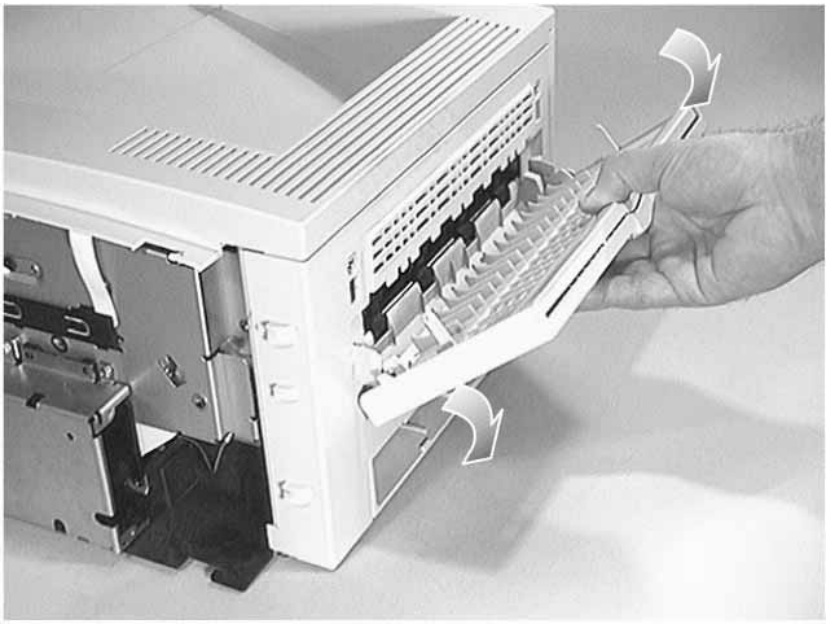


Rear Cover Removal

1 Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)

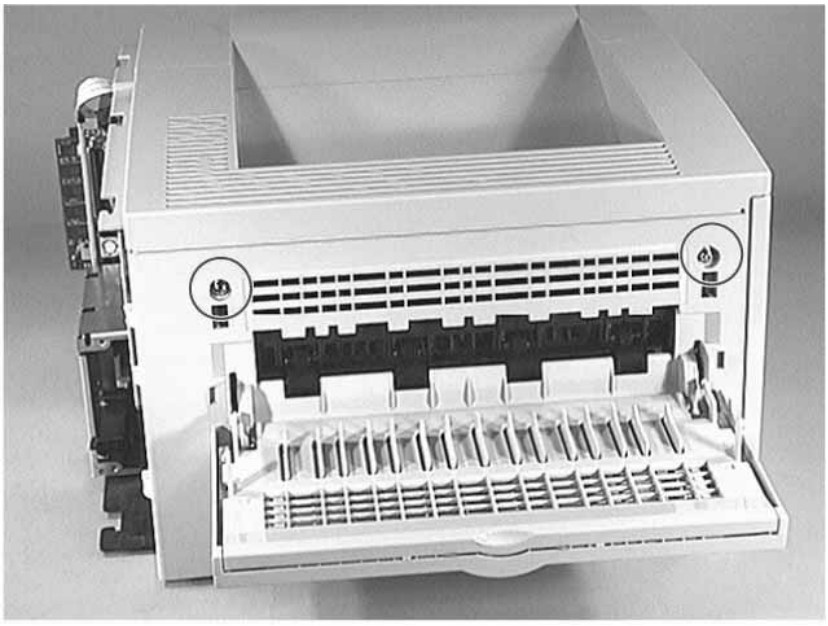
2 Open the rear output bin until it stops (see figure 7-94), and then pull it again so that it rests parallel with the floor.

Figure 7-30 Opening the Rear Output Bin



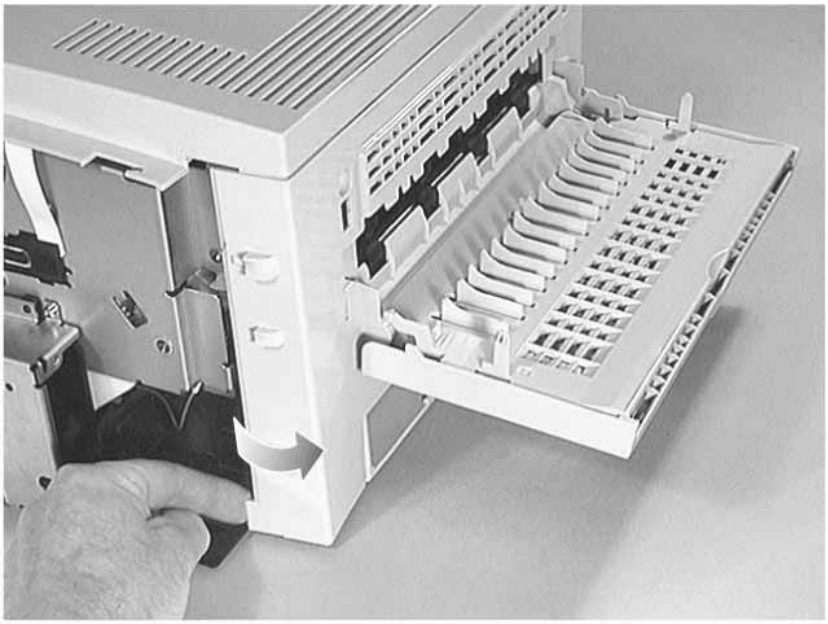
3 Remove the two screws shown in figure 7-31.

Figure 7-31 Removing Screws on Rear Cover



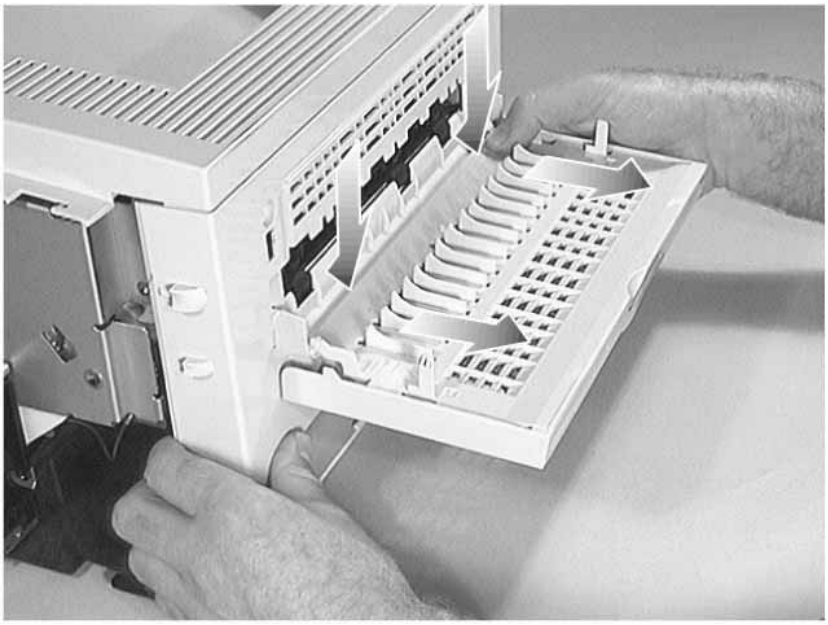
4 Pull the bottom-left corner of the rear cover as shown in figure 7-32.

Figure 7-32 Releasing the Rear Cover's Latch



5 Pull the rear cover down and then out to remove it.

Figure 7-33 Removing the Rear Cover



Fusing Assembly Removal

Turn the power off and unplug the power cord before removing the fusing assembly. After turning the power off, let the fusing assembly cool down for several minutes.

Do not insert metallic objects into the opening shown in figure 7-34. The print engine test button is located on the back of the printer as shown in figure 7-35.

Figure 7-34 Not a Print Engine Test Button

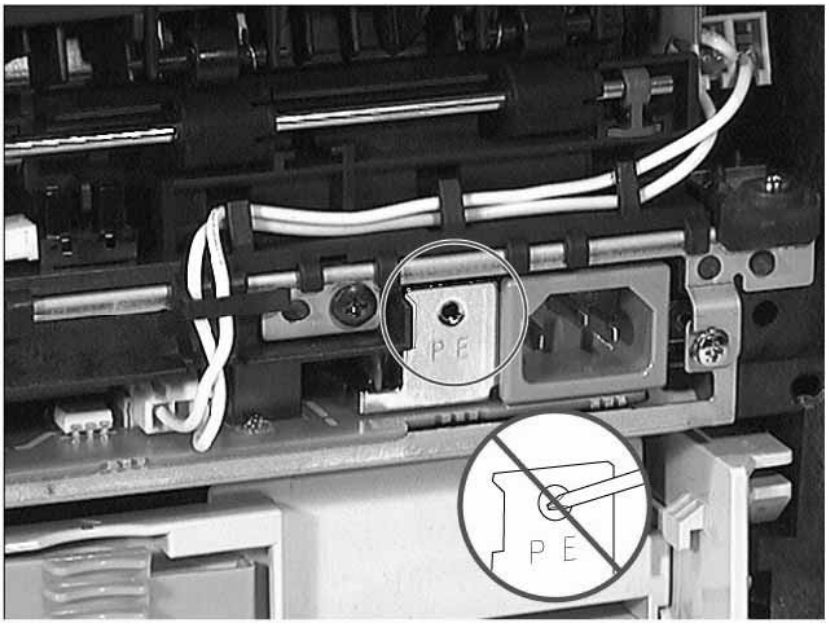
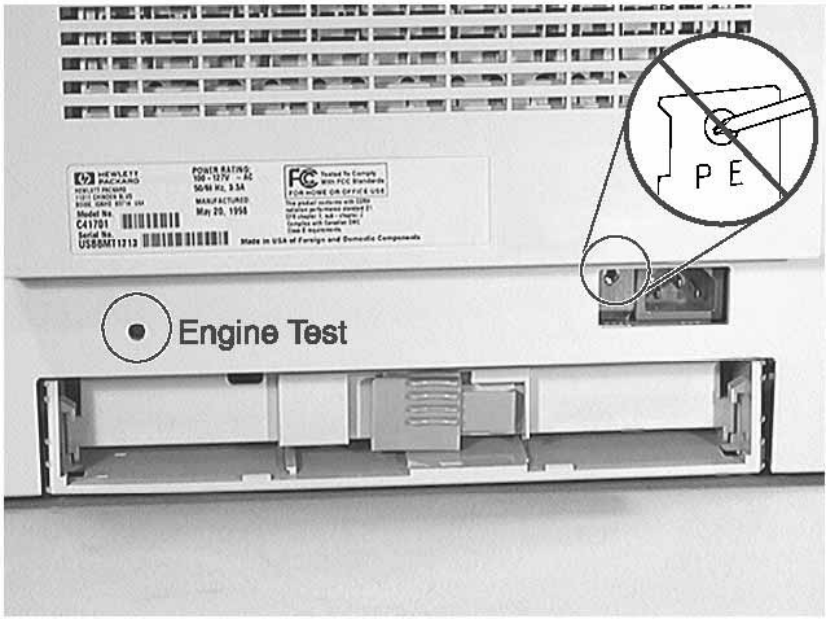


Figure 7-35 Print Engine Test Button



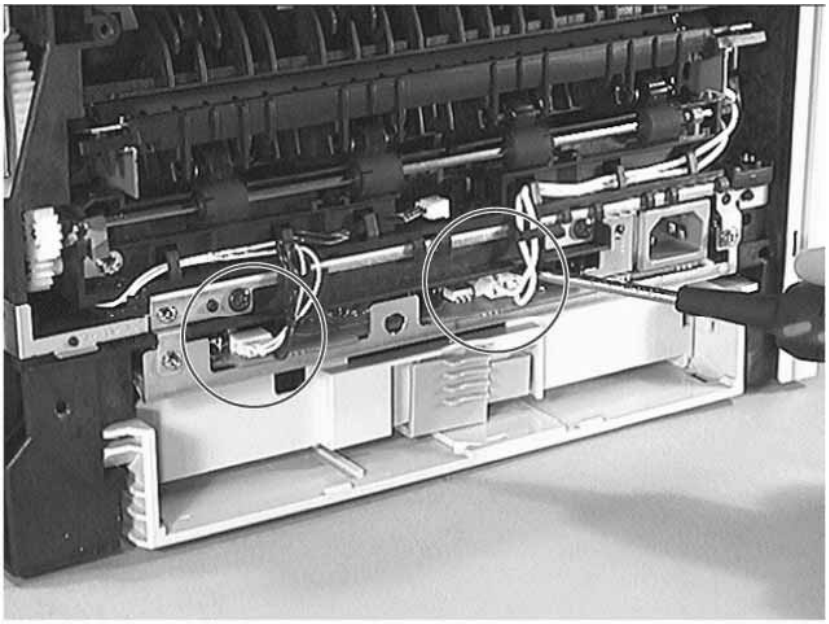
1 Remove the following assemblies:

- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)

2 To disconnect the left wire connector pull it straight out (see figure 7-36).

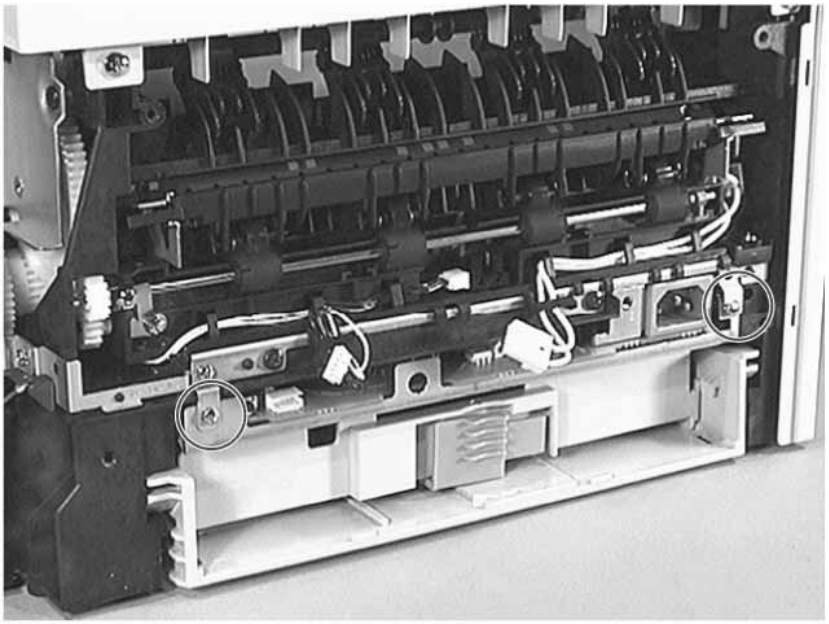
3 To disconnect the right wire connector press a flat blade screwdriver on the connector and then pull out the connector.

Figure 7-36 Removing Wire Connectors on Fusing Assembly



4 Remove the two grounding plate screws shown in figure 7-37.

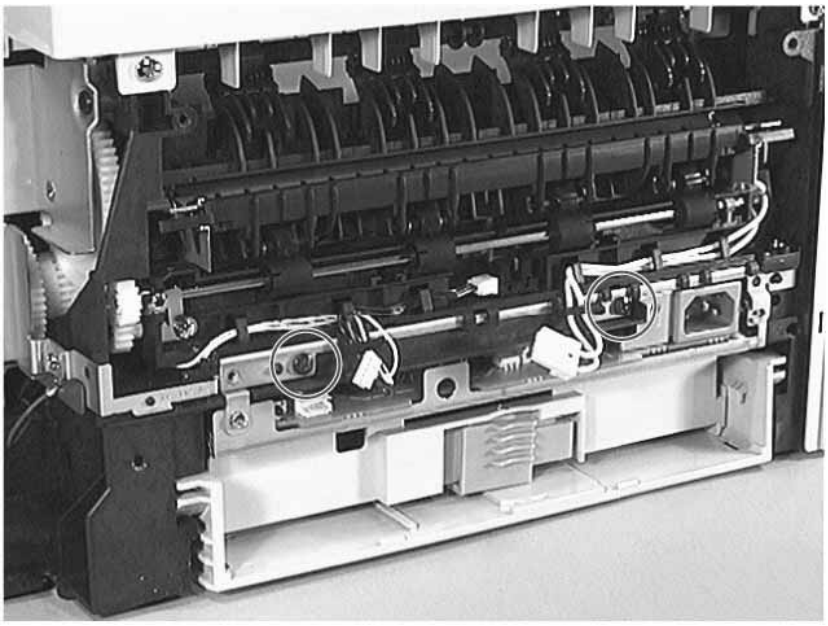
Figure 7-37 Removing the Fusing Assembly's Grounding Plate Screws



5 Remove the two screws shown in figure 7-38, which fasten the fuser assembly to the

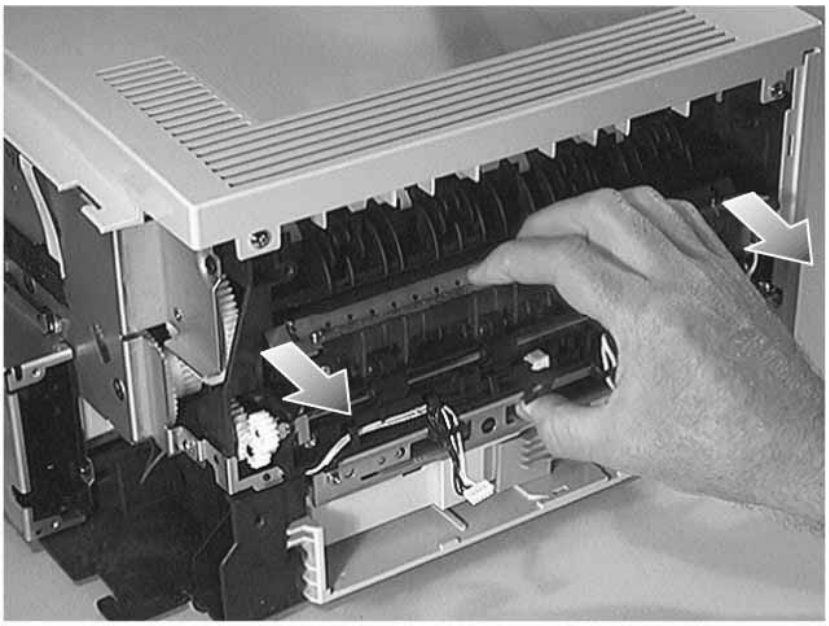
printer.

Figure 7-38 Removing the Fusing Assembly's Screws



6 Remove the fuser assembly from the printer.

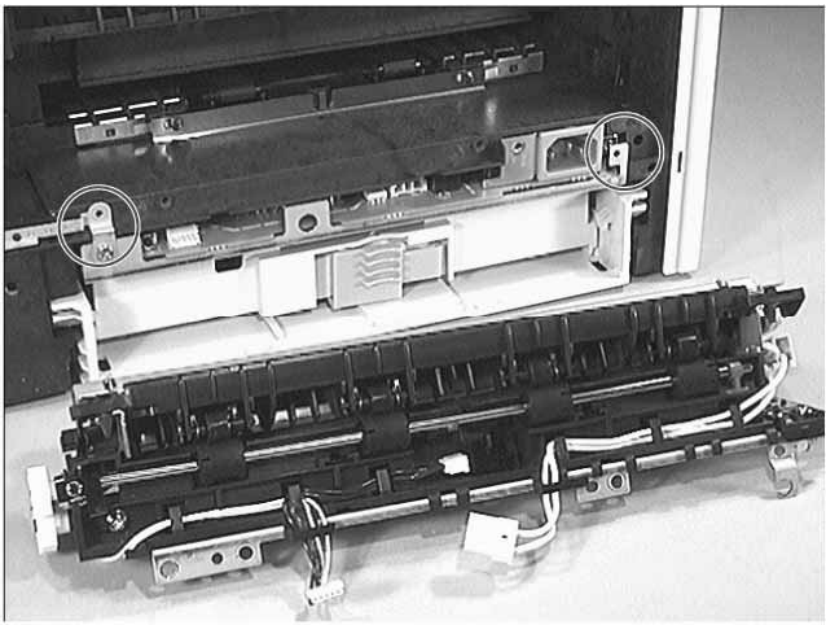
Figure 7-39 Removing the Fusing Assembly



Fusing Assembly Replacement

When replacing the fusing assembly, use the guide pins shown in figure 7-40 to correctly align it.

Figure 7-40 Replacing the Fusing Assembly

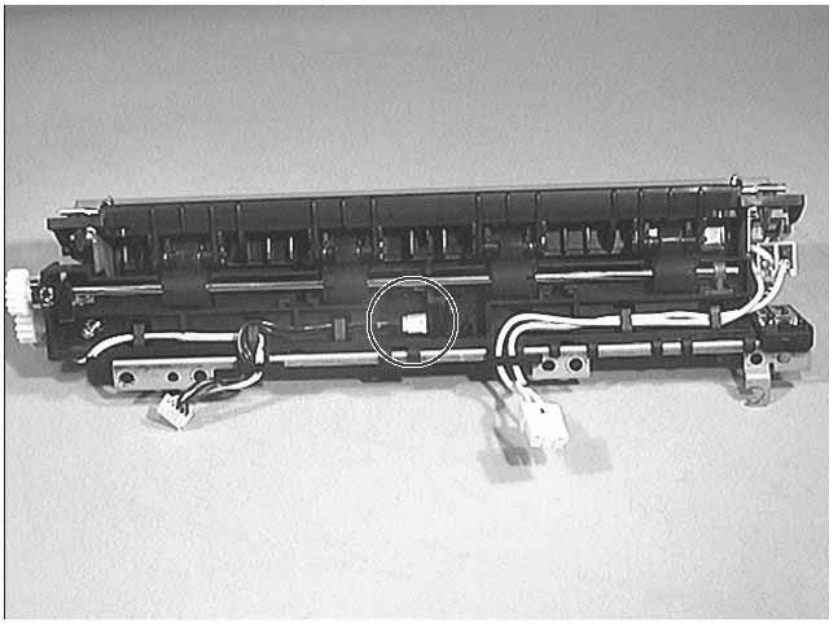


Fusing Film Removal

1 Remove the fusing assembly. (See “Fusing Assembly Removal” (page 179) for instructions.)

2 Disconnect the wire shown in figure 7-41.

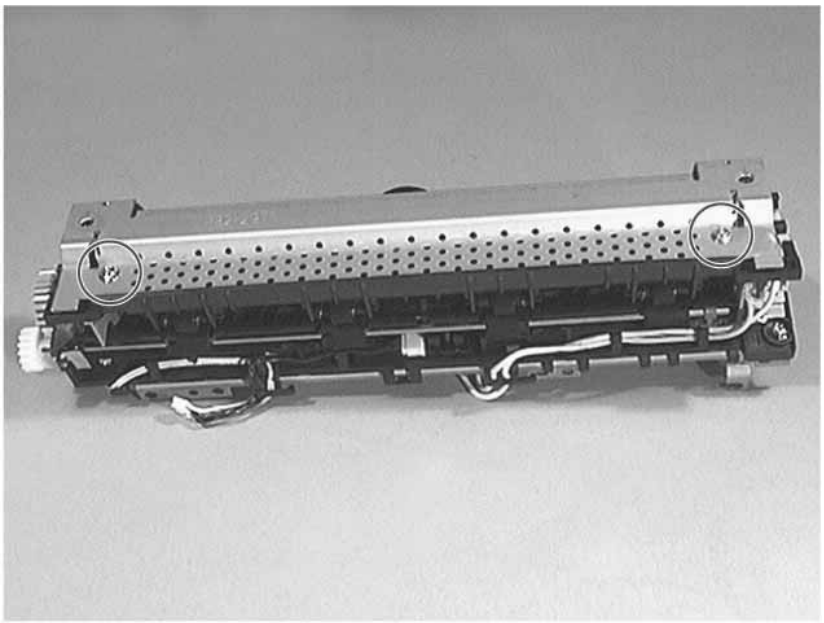
Figure 7-41 Disconnecting Fusing Assembly Wire



3 Remove the wires from the cable harnesses.

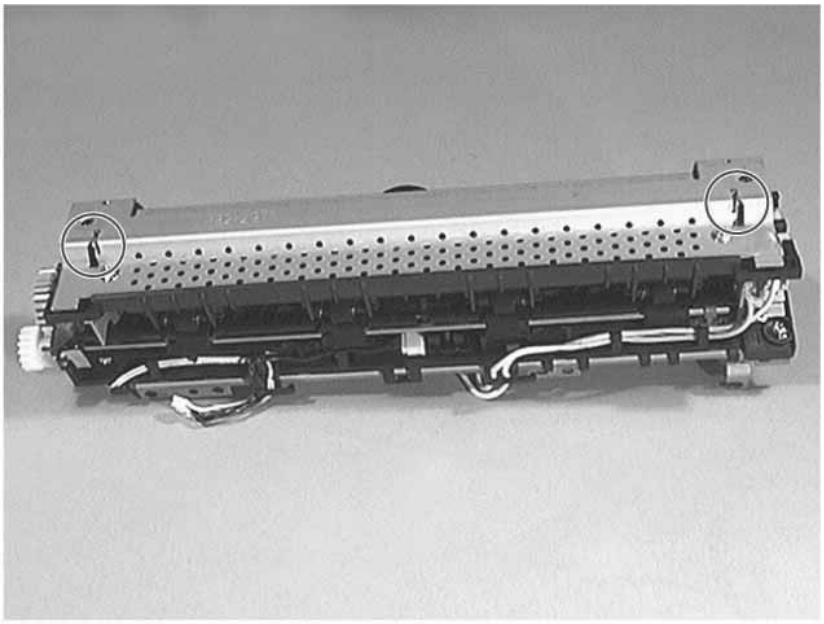
4 Remove the two screws shown in figure 7-42.

Figure 7-42 Removing the Fusing Assembly’s Screws



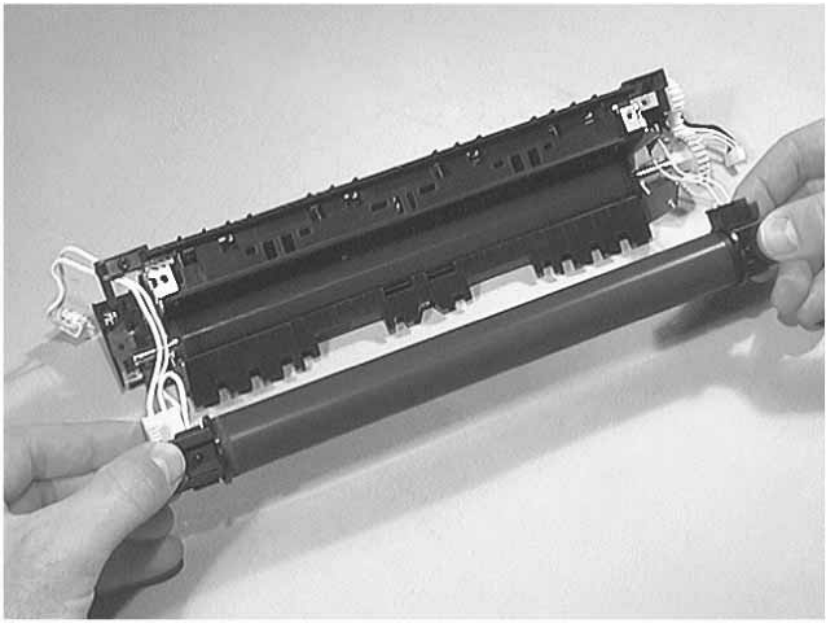
5 Press the clips shown in figure 7-43 to remove the pressure plate.

Figure 7-43 Removing the Pressure Plate Screws



6 Remove the fusing film.

Figure 7-44 Removing the Fusing Film



Pressure Roller Removal

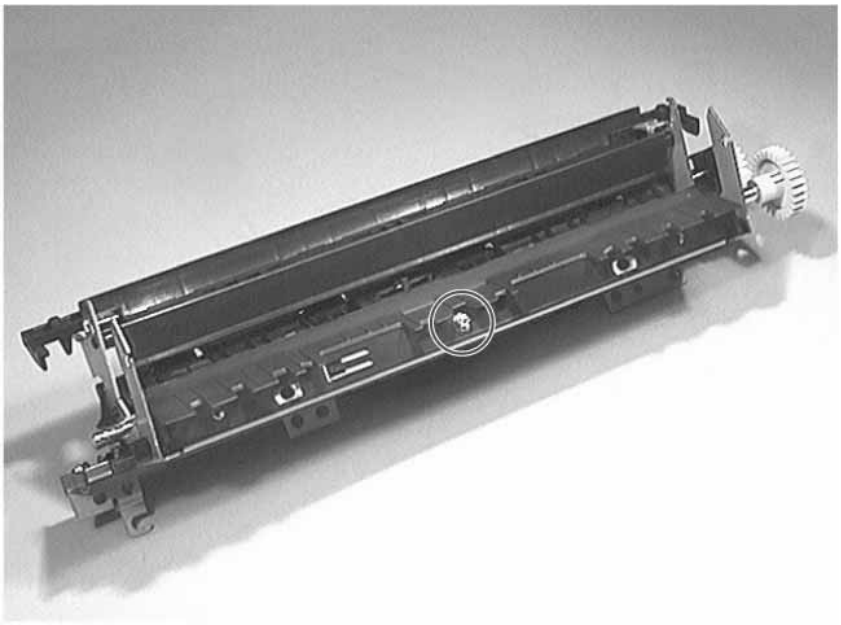
1 Remove the following assemblies:

- Remove the fusing assembly. (See “Fusing Assembly Removal” (page 179) for instructions.)
- Remove the fusing film. (See “Fusing Film Removal” (page 183) for instructions.)

2 Remove the screw shown in figure 7-45, which holds the fusing entrance guide.

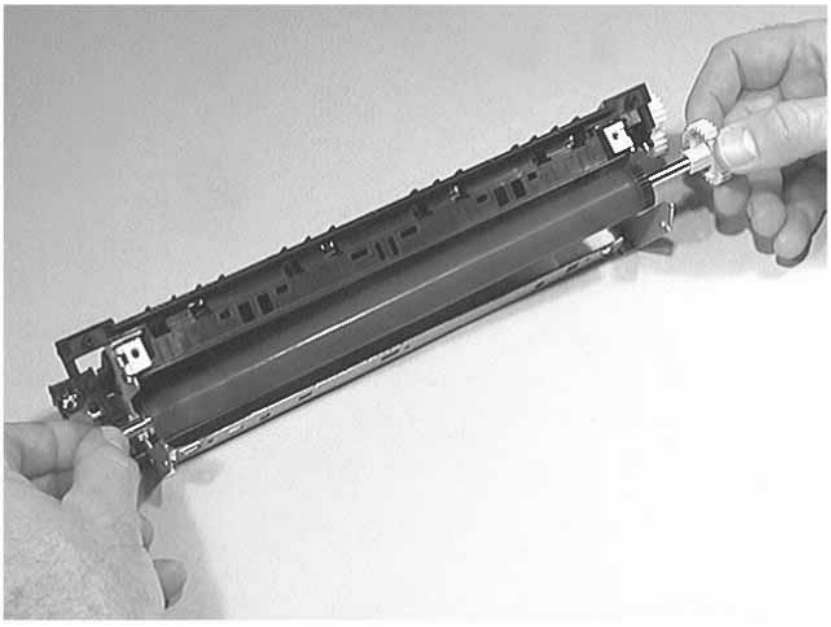
3 To remove the fusing entrance guide slide it toward the gears (see figure 7-45).

Figure 7-45 Removing Fusing Entrance Guide Screw



4 Lift and remove the pressure roller.

Figure 7-46 Removing the Pressure Roller



Engine Controller Assembly Removal

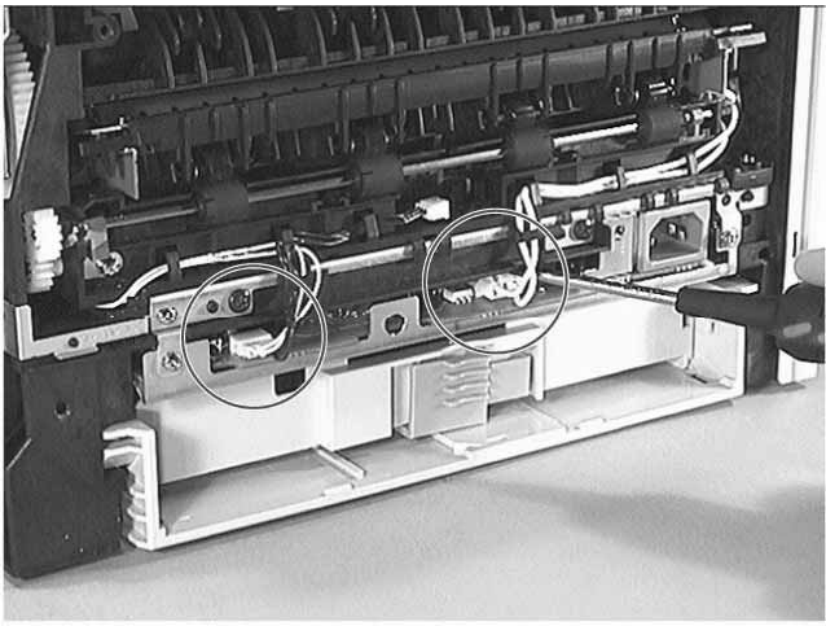
1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove Tray 2. (See “Tray 2 Removal” (page 157) for instructions.)
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)

2 Disconnect the fusing assembly’s left wire connector (see figure 7-47).

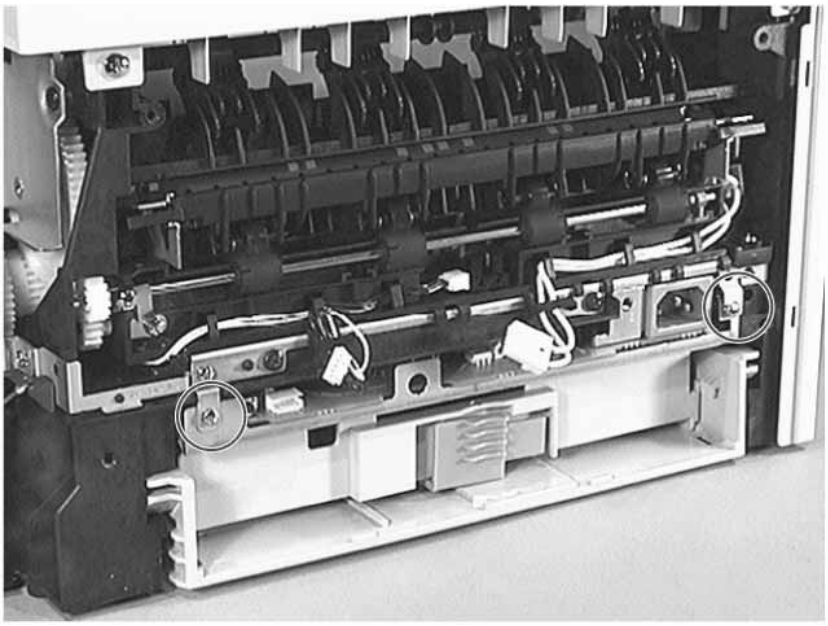
3 To disconnect the right wire connector press a flat blade screwdriver on the connector and then pull out the connector. (see figure 7-47).

Figure 7-47 Removing the Fusing Assembly’s Wire Connectors



4 Remove the two grounding plate screws shown in figure 7-48.

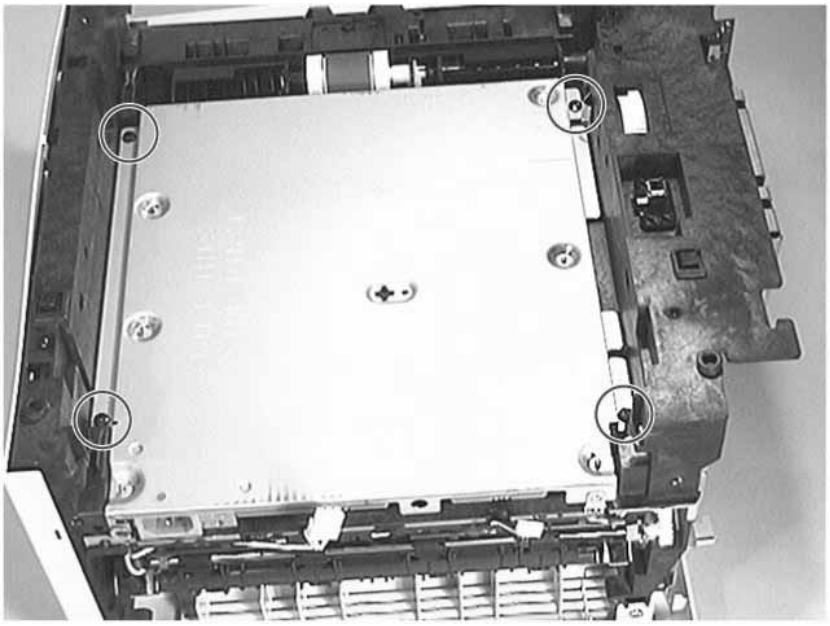
Figure 7-48 Removing the Fusing Assembly's Grounding Plate Screws



5 Place the printer top-down with the fusing assembly facing outward.

6 Remove the four screws shown in figure 7-49.

Figure 7-49 Removing the Engine Controller Assembly's Screws

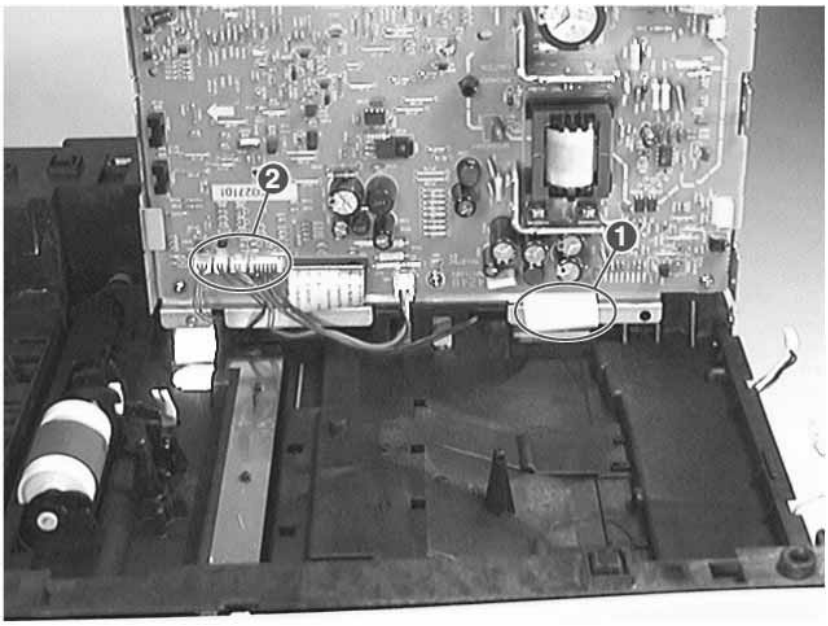


7 Lift the left side of the engine controller assembly. All of the wire connectors are attached to the right side of the engine controller assembly.

8 Disconnect the formatter PCB's cable, which is the ribbon cable closest to the fusing

assembly (see figure 7-50).

Figure 7-50 Removing the Formatter PCB's Cable



9 Disconnect all of the other cables shown in figure 7-50 except for the ribbon cable. It does not have to be disconnected to remove the engine controller assembly.

10 Remove the engine controller assembly.

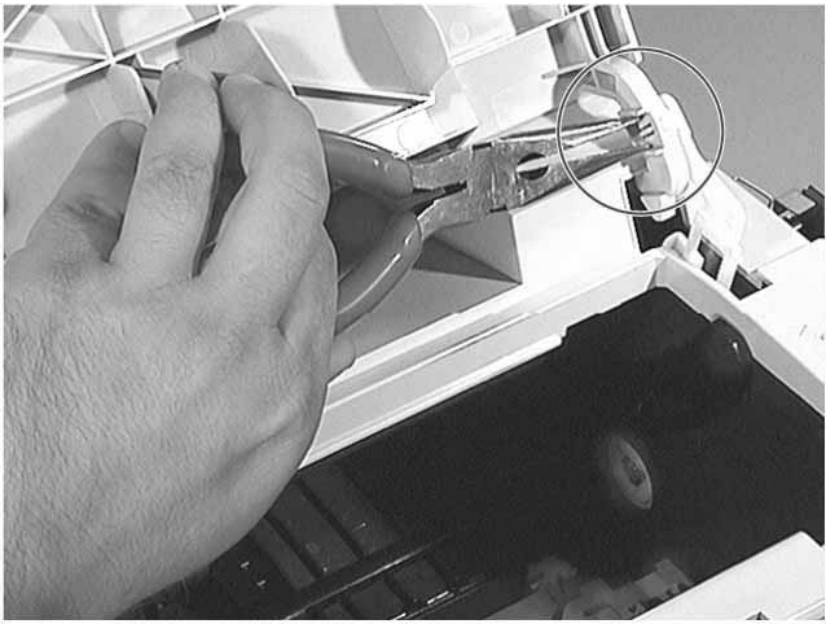
Top Cover Removal

1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)

2 Release the swing arm from the toner cartridge door (see figure 7-51), and push it down in the opening.

Figure 7-51 Releasing Swing Arm from Toner Cartridge Door

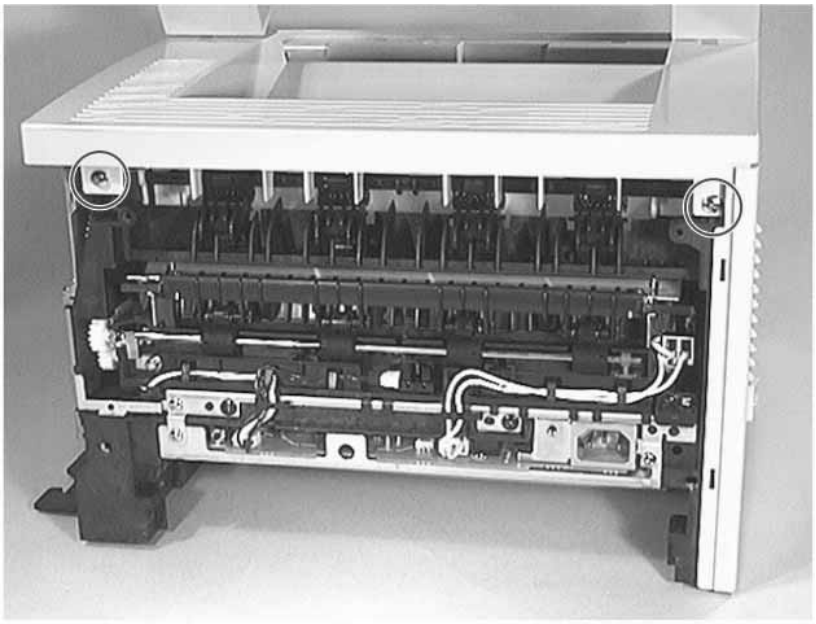


3 Remove the screws shown in figure 7-52.

Figure 7-52 Removing Screws from the Top Cover (1 of 2)

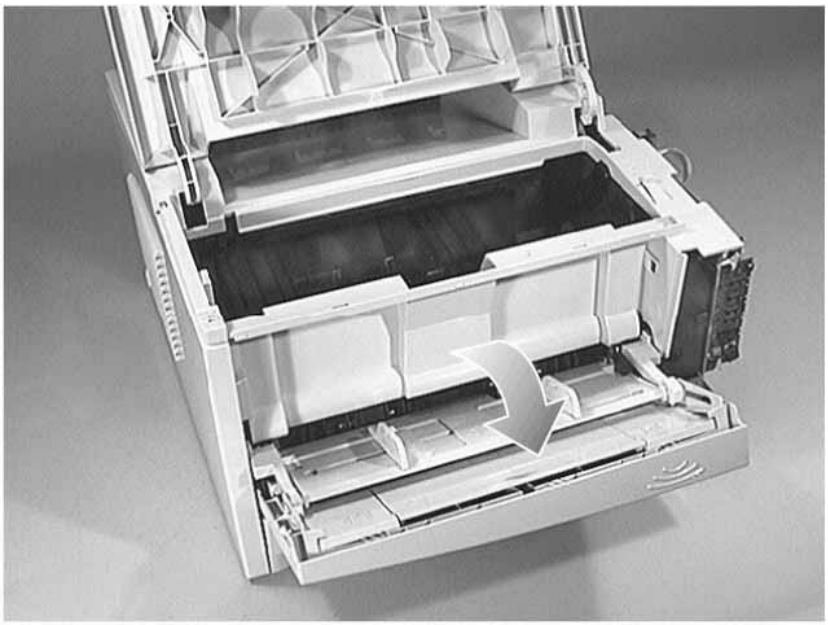
4 Remove the screws shown in figure 7-53.

Figure 7-53 Removing Screws from the Top Cover (2 of 2)



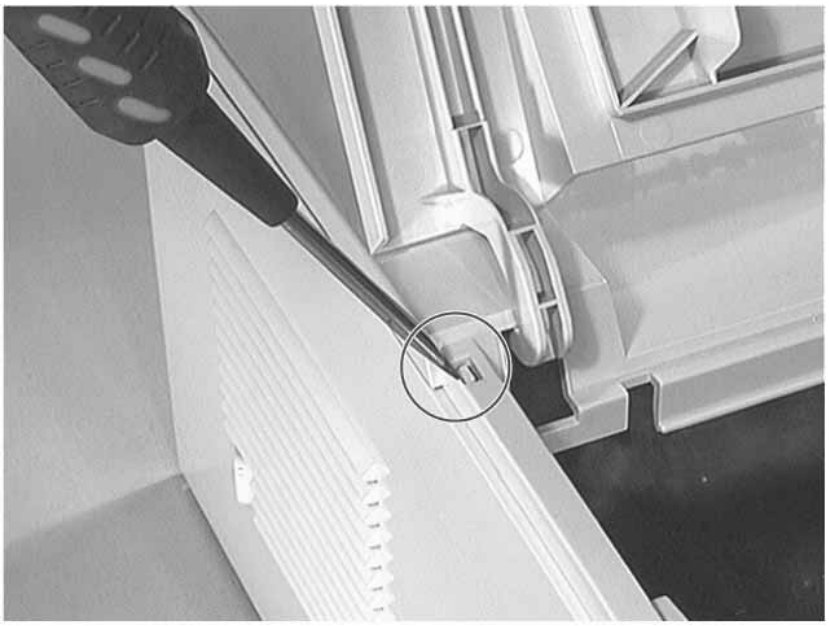
5 Open Tray 1.

Figure 7-54 Opening the multi-purpose input tray



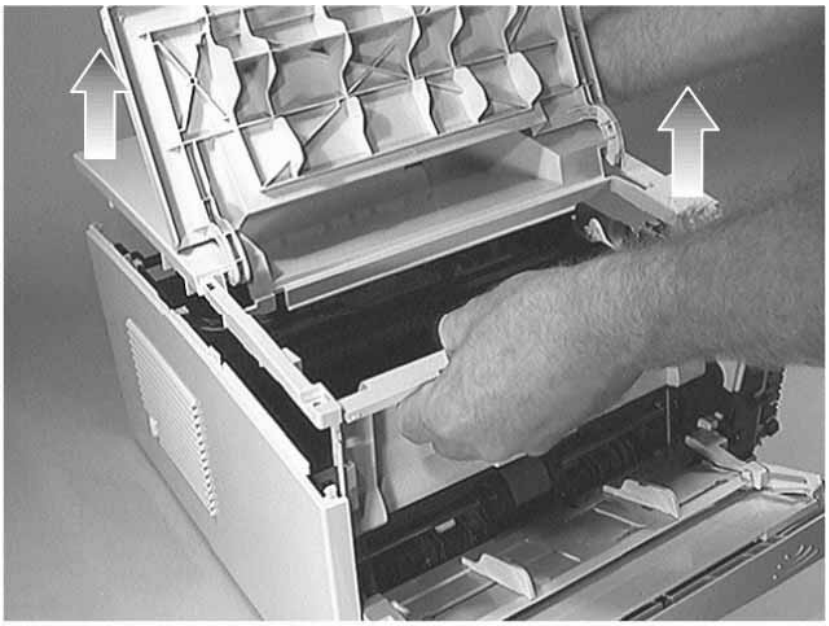
6 Release the latch shown in figure 7-55.

Figure 7-55 Releasing the Latch on the Top Cover



7 Lift the top cover to remove it.

Figure 7-56 Removing the Top Cover



NOTE: Two of the four screws removed in the above procedure are longer than the other two. When replacing the top cover, these screws go in the holes shown in figure 7-52.

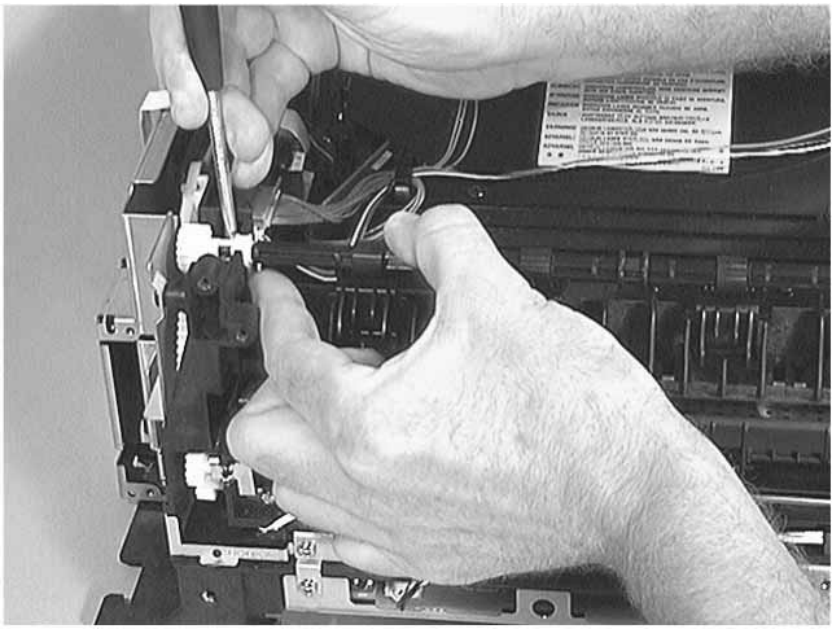
Upper Output Delivery Roller Removal

1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove Tray 2. (See “Tray 2 Removal” (page 157) for instructions.)
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the left cover. (See “Left Cover Removal” (page 229) for instructions.)

2 Release both clips on the geared end of the roller’s shaft while lifting it (see figure 7-57).

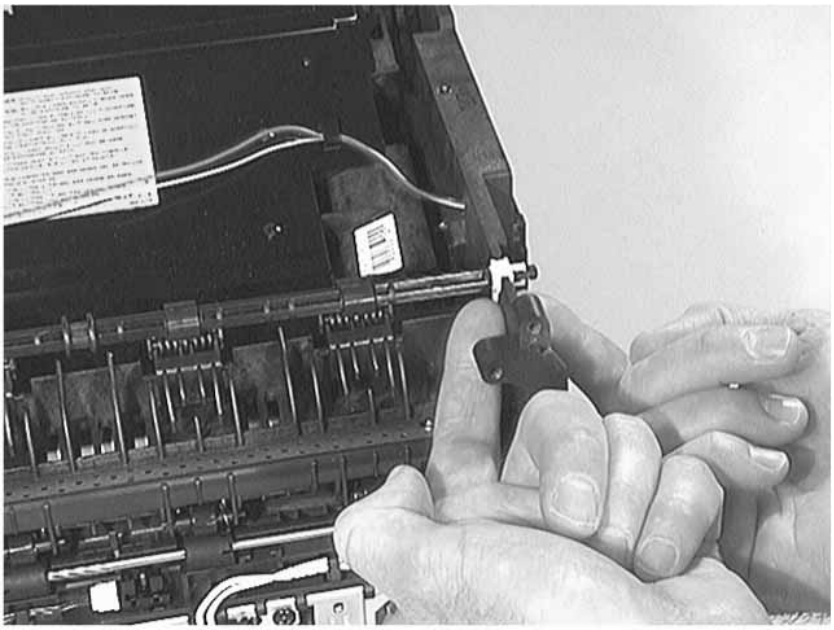
Figure 7-57 Removing the Upper Output Delivery Roller (1 of 2)



3 Release both clips on the non-geared end of the roller’s shaft while lifting it (see figure

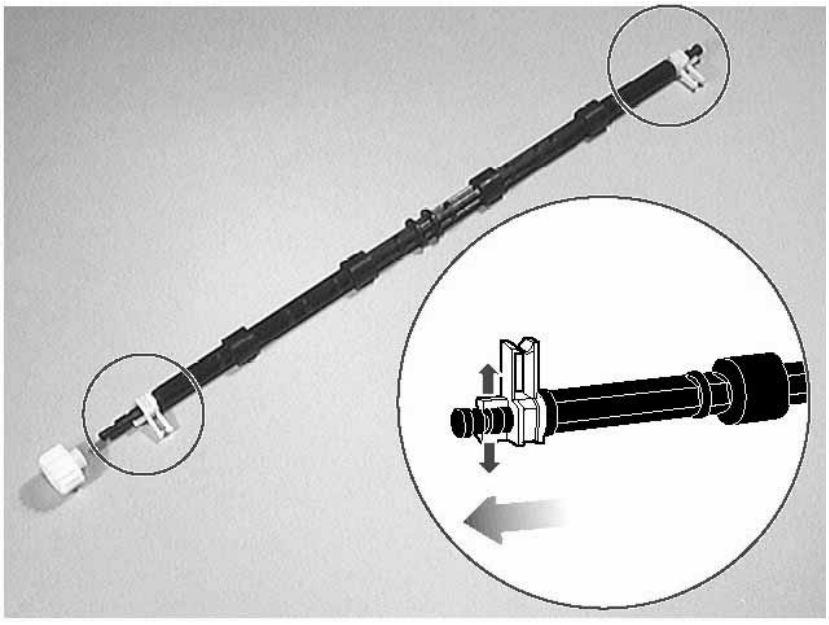
7-58).

Figure 7-58 Removing the Upper Output Delivery Roller (2 of 2)



NOTE: During replacement, remove the gear and clips shown in figure 7-59. These items do not come with a new upper output delivery roller.

Figure 7-59 Removing Gear and Clips for use in Replacement



Lower Output Delivery Roller Removal

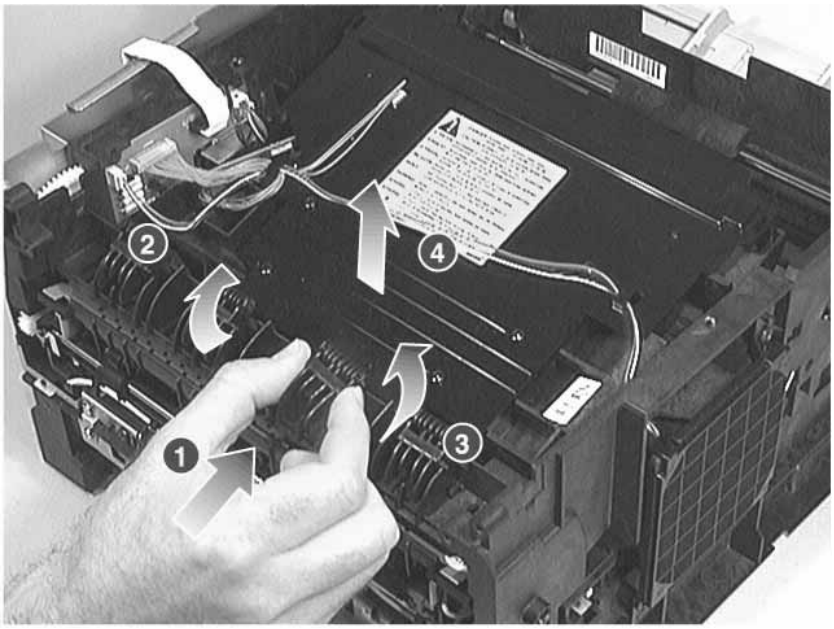
1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove Tray 2. (See “Tray 2 Removal” (page 157) for instructions.)
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the left cover. (See “Left Cover Removal” (page 229) for instructions.)
- Remove the upper output delivery roller. (See “Transfer Roller Removal” (page 158) for instructions.)

2 Push the roller forward and lift the left end out from the seated position (see figure 7-60).

3 Lift the right end of the roller and remove it.

Figure 7-60 Removing the Lower Output Delivery Roller



Laser Scanner Assembly Removal

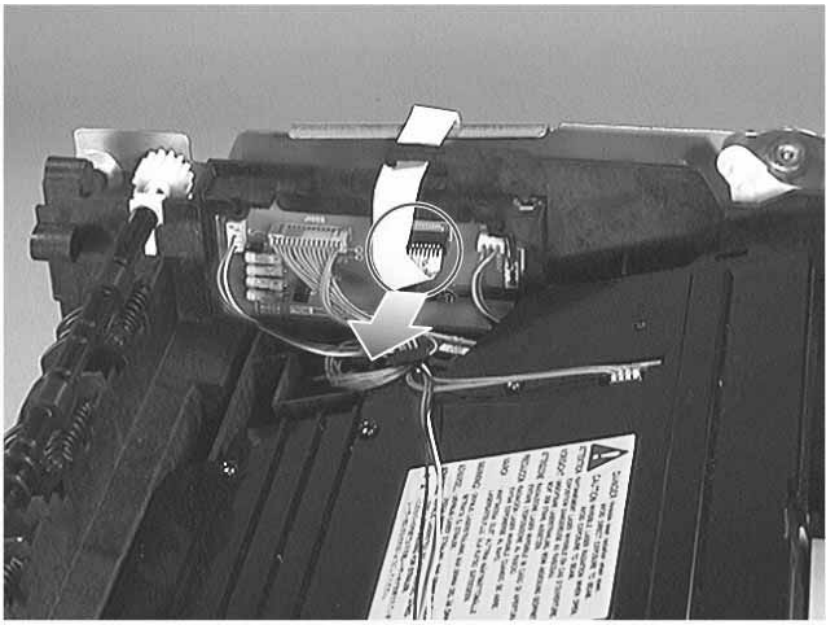
1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)

2 Disconnect the power cables from the cooling fan and the laser scanner assembly (see figure 7-61).

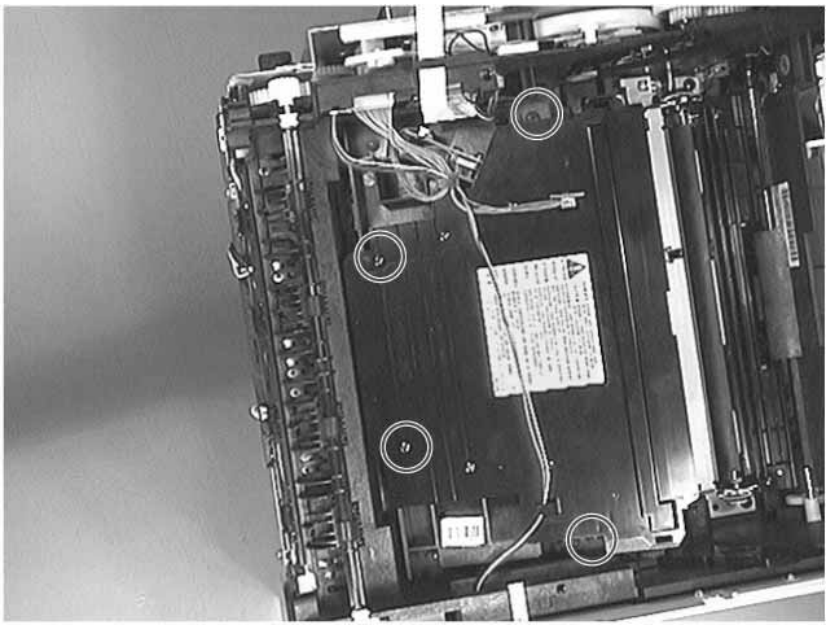
3 Remove the fan’s power cable from the routing clips located on top of the laser scanner assembly.

Figure 7-61 Disconnecting Power Cables



4 Remove the four screws shown in figure 7-62.

Figure 7-62 Removing the Laser Scanner Assembly's Screws



5 Lift the laser scanner assembly out of the printer.

NOTE: The laser scanner's (4) self-tapping screws are longer than the other self-tapping screws on the printer.

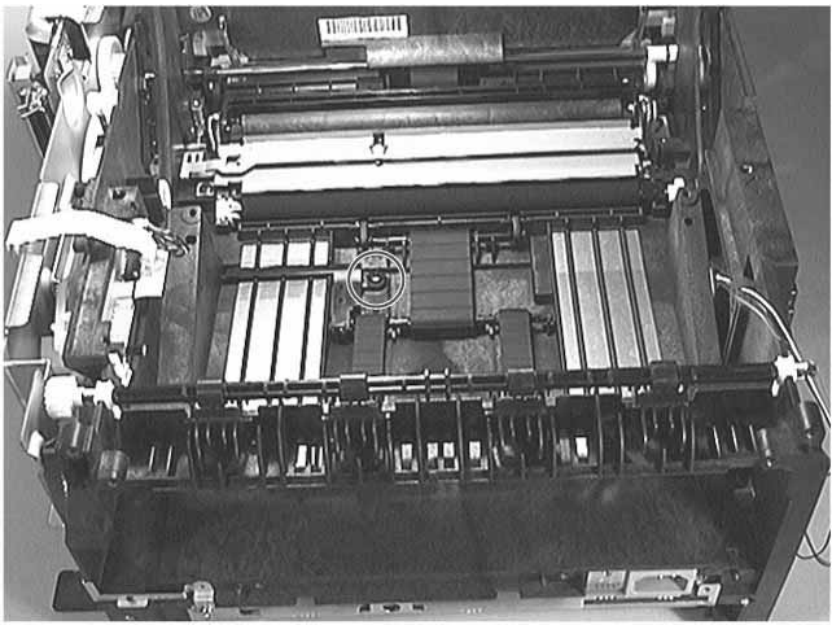
Transport Belts and Rollers Removal

1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove Tray 2. (See “Tray 2 Removal” (page 157) for instructions.)
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the left cover. (See “Left Cover Removal” (page 229) for instructions.)
- Remove the fusing assembly. (See “Fusing Assembly Removal” (page 179) for instructions.)
- Remove the laser scanner assembly. (See “Laser Scanner Assembly Removal” (page 195) for instructions.)

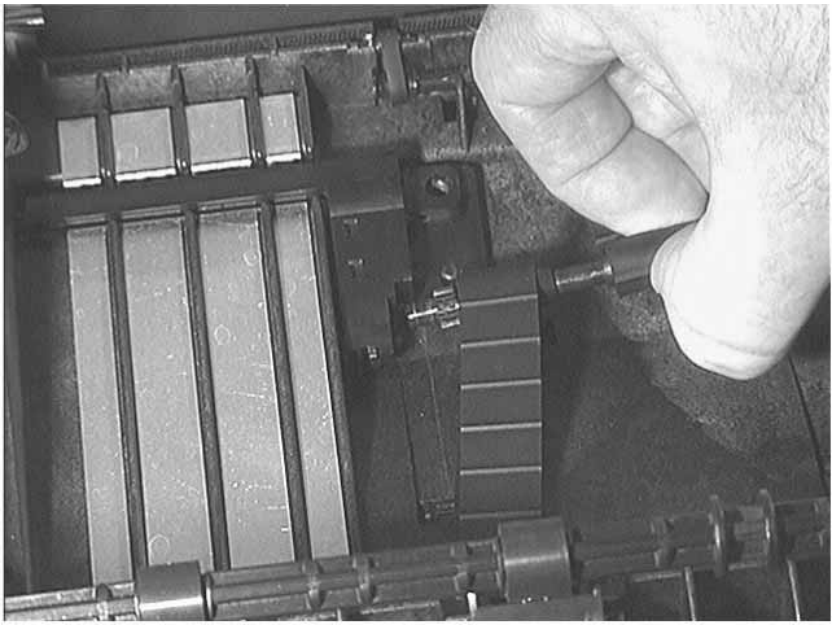
2 Remove the screw shown in figure 7-63.

Figure 7-63 Removing the Transport’s Screw



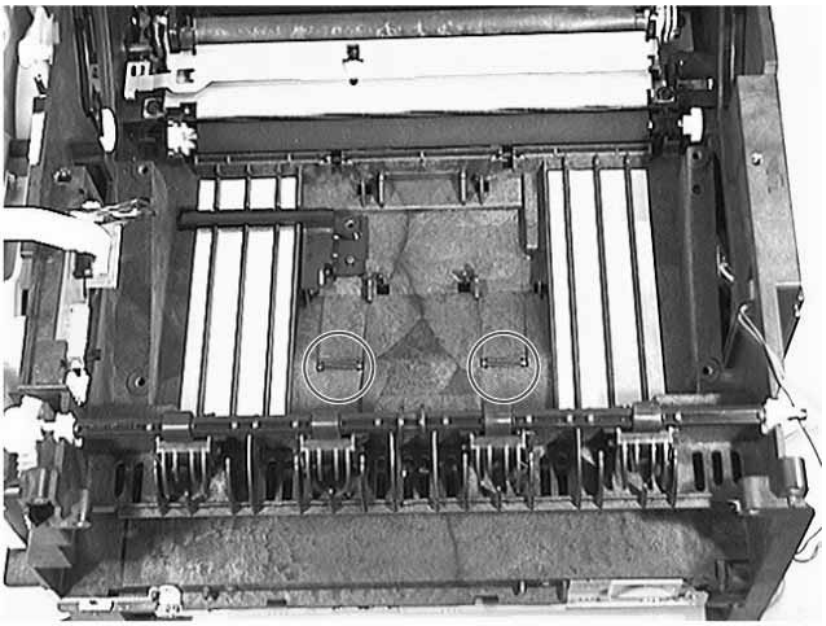
3 Lift the center shaft (see figure 7-64) out of its carriage and gear box.

Figure 7-64 Transport Belts and Rollers



4 Remove all of the belts and rollers in any order. Do not overlook the two rollers located in the bottom of the printer (see figure 7-65). Lift each to remove it.

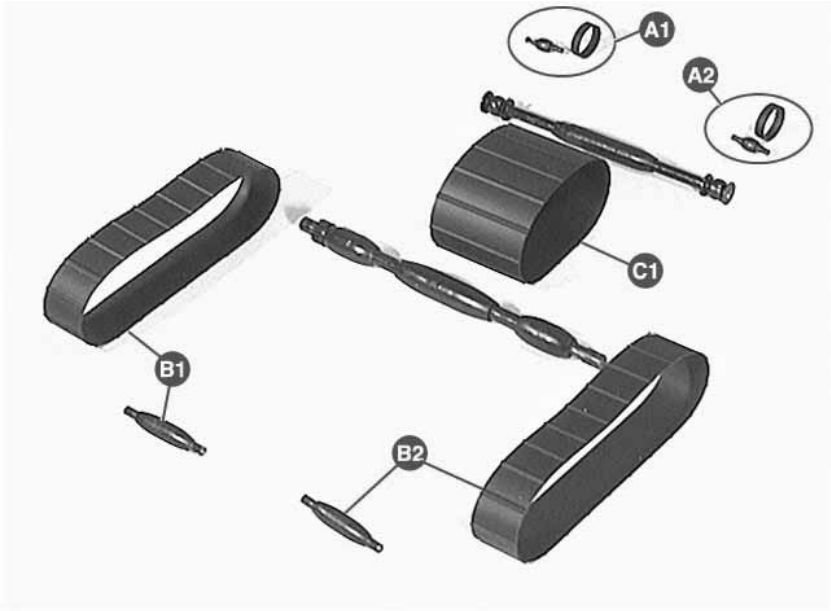
Figure 7-65 Removing Small Rollers



Transport Belts and Rollers Replacement

Figure 7-66 identifies all of the parts used in this procedure.

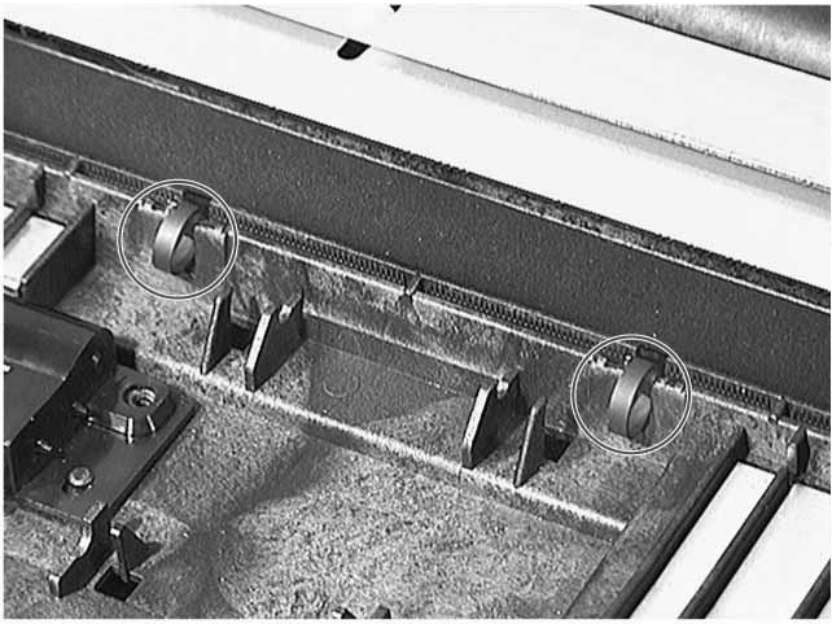
Figure 7-66 Transport Belts and Rollers



1 Install the small rollers back in the bottom of the printer (see figure 7-65).

2 Install the A-1 belt and roller back in its carriage as shown in figure 7-67. Perform the same procedure to install the A-2 belt and roller.

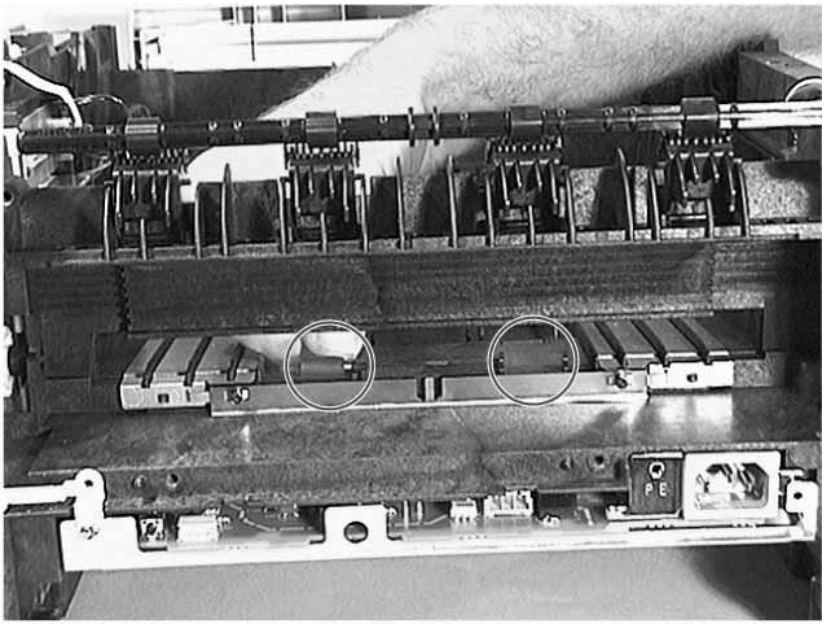
Figure 7-67 Installing the A-1 Belt and Roller



3 Install the B-1 belt and roller back in its carriage as shown in figure 7-68. Perform the

same procedure to install the B-2 belt and roller.

Figure 7-68 Installing the B-1 Belt and Roller

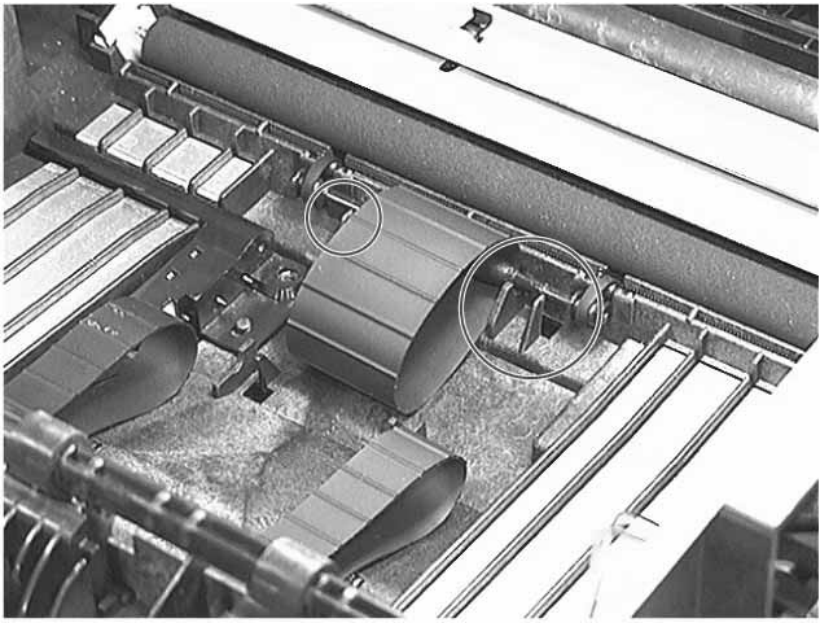


4 Insert the non-geared roller shaft through belt C-1.

5 Insert one at a time the ends of the non-geared roller shaft through the A-1 and A-2 belts while holding down the A-1 and A-2 rollers.

6 Snap the non-geared roller shaft into its carriage.

Figure 7-69 Installing the Non-Geared Roller Shaft



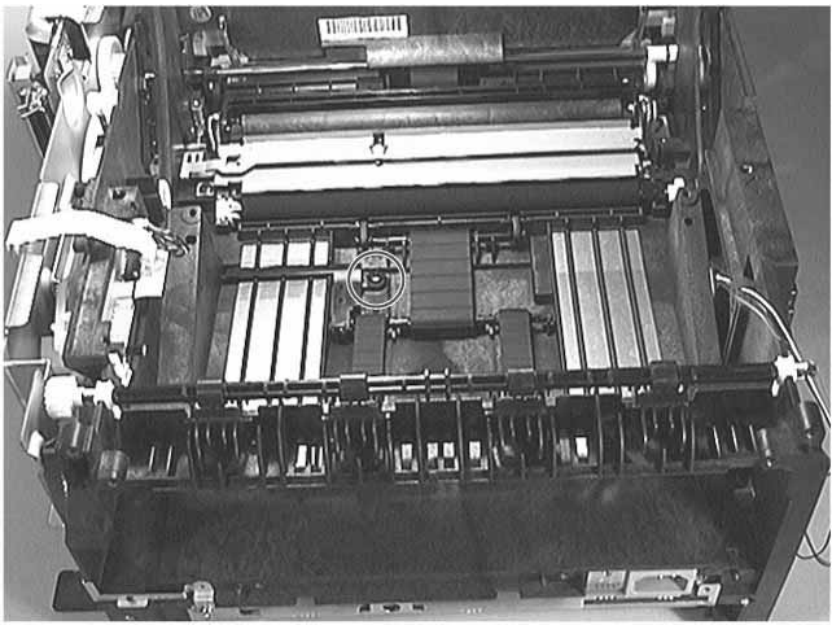
7 Insert the geared roller shaft through belt C-1.

8 Insert one at a time the ends of the geared roller shaft through the B-1 and B-2 belts.

9 Insert the geared roller shaft into the printer drive assembly, and then snap it into its carriage.

10 Replace the screw shown in figure 7-70.

Figure 7-70 Replacing the Gear Box Screw



11 If the printer drive assembly is removed, rotate the transport gear several revolutions to properly align the belts and rollers.

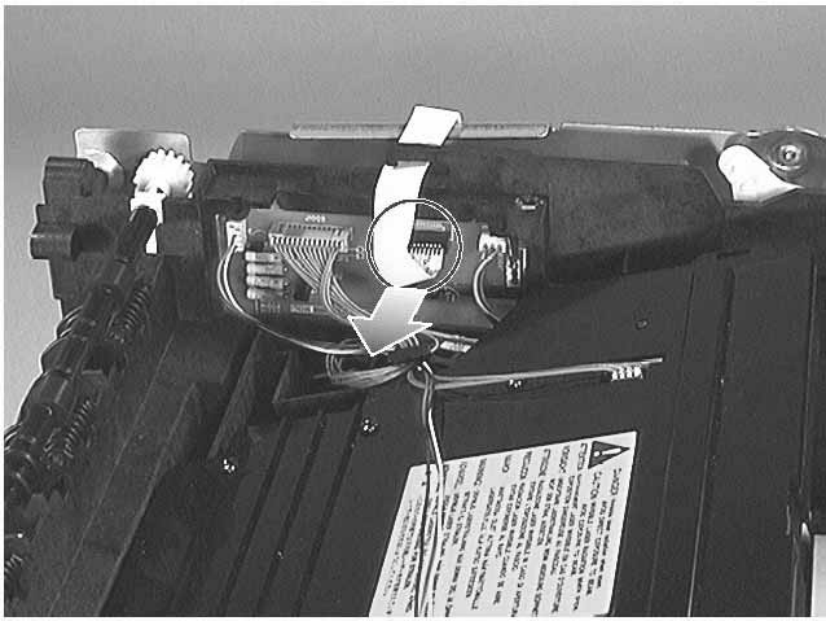
Ribbon Cable Harness Removal

1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the formatter PCB. (See “Formatter PCB Removal” (page 174) for instructions.)

2 Disconnect the ribbon cable at the location shown in figure 7-71.

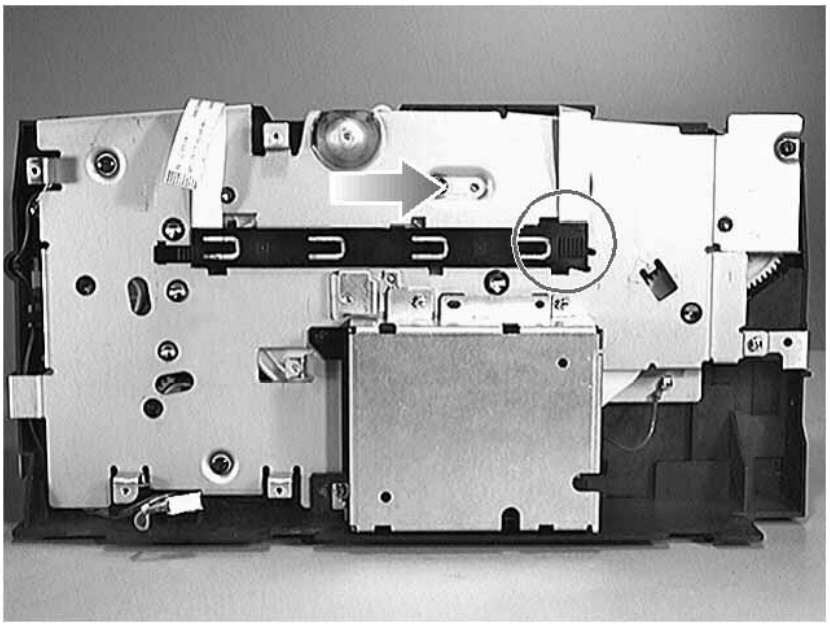
Figure 7-71 Disconnecting the Printer Drive Assembly’s Ribbon Cable



3 Lift the tab shown in figure 7-72, and then slide the ribbon cable harness to the right to

remove it.

Figure 7-72 Removing the Ribbon Cable Harness



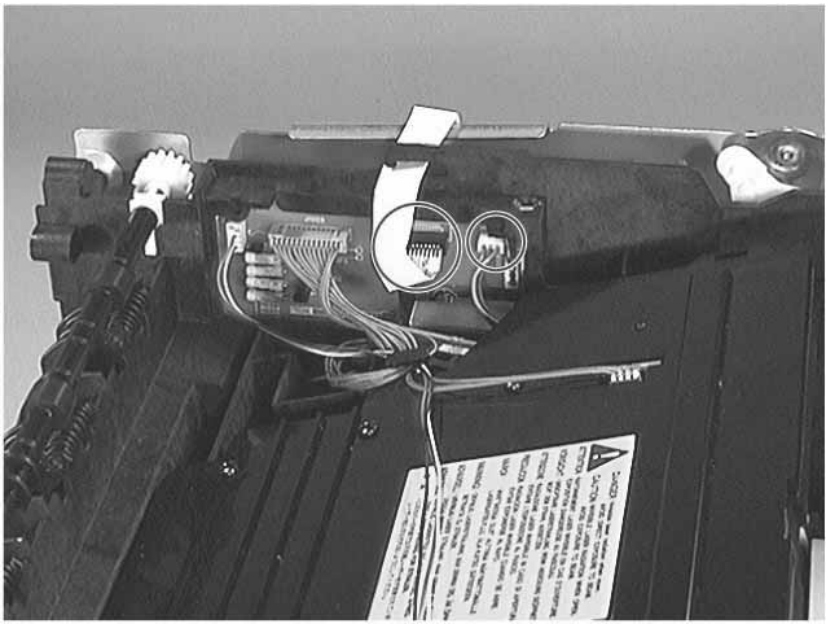
Printer Drive Assembly Removal

1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the formatter PCB. (See “Formatter PCB Removal” (page 174) for instructions.)

2 Disconnect the ribbon cable and the main motor cable shown in figure 7-73. The green ground wire is disconnected in the next step.

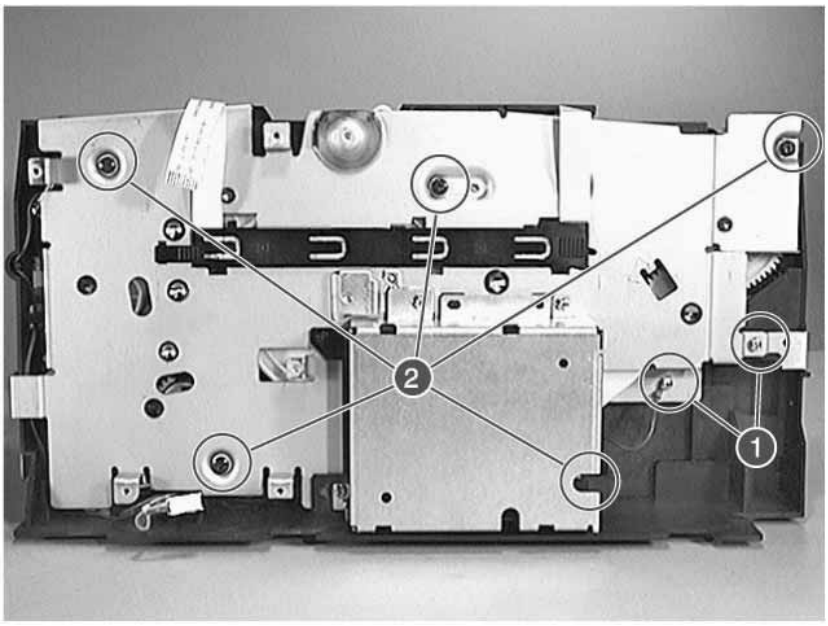
Figure 7-73 Disconnecting the Printer Drive Assembly’s Cables



3 Remove the (two ground and five self-tapping) screws shown in figure 7-74.

4 Lift out the printer drive assembly to remove it.

Figure 7-74 Removing the Printer Drive Assembly's Screws



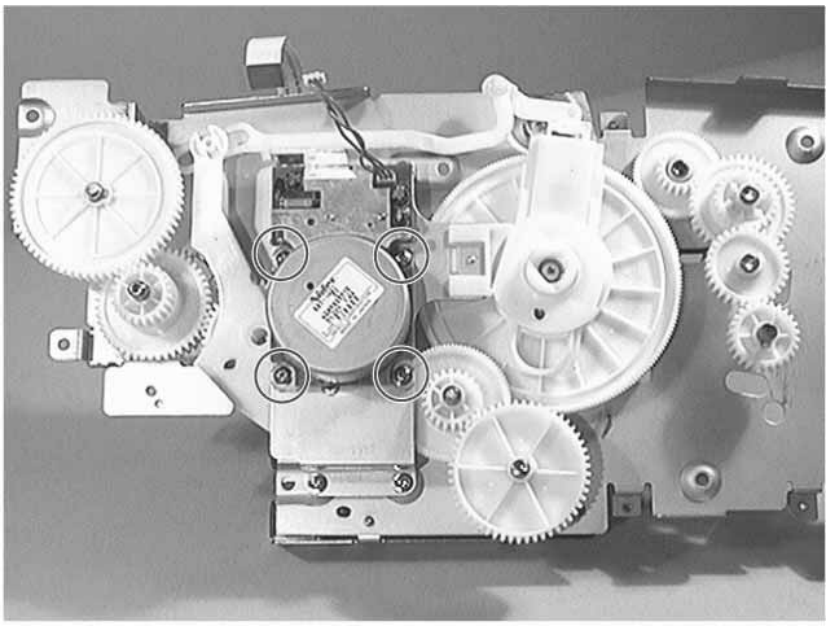
Main Motor Removal

1 Remove the printer drive assembly. (See “Printer Drive Assembly Removal” (page 204) for instructions.

2 Remove the four screws shown in figure 7-75.

3 Lift the motor to remove it.

Figure 7-75 Removing the Main Motor Screws



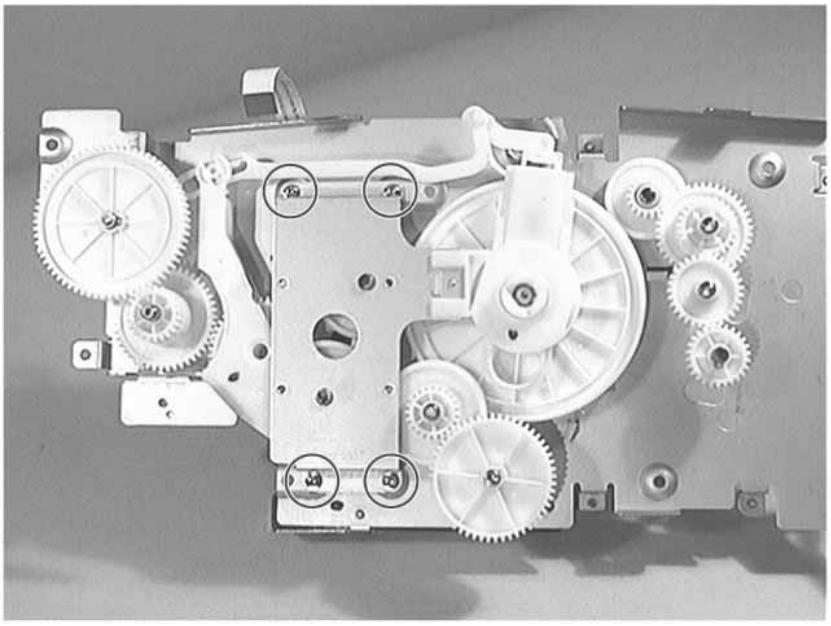
Motor Plate Removal

1 Remove the following assemblies:

- Remove the printer drive assembly. (See “Printer Drive Assembly Removal” (page 204) for instructions.
- Remove the main motor. (See “Main Motor Removal” (page 206)for instructions.)

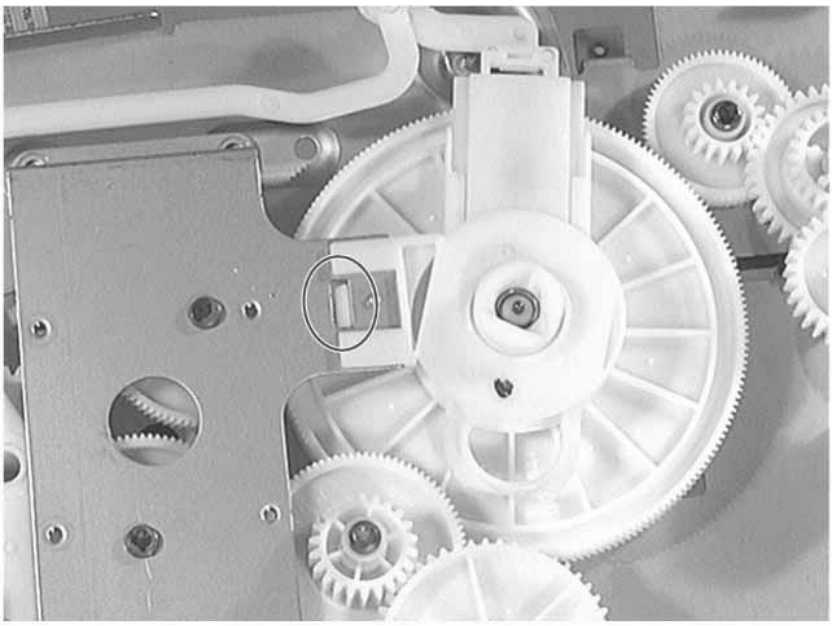
2 Remove the four screws shown in figure 7-76

Figure 7-76 Removing the Motor Plate Screws



3 Press and hold the clip shown in figure 7-77, and then slide the motor plate out of the plastic holder while holding the bushing down with the other hand.

Figure 7-77 Removing the Motor Plate



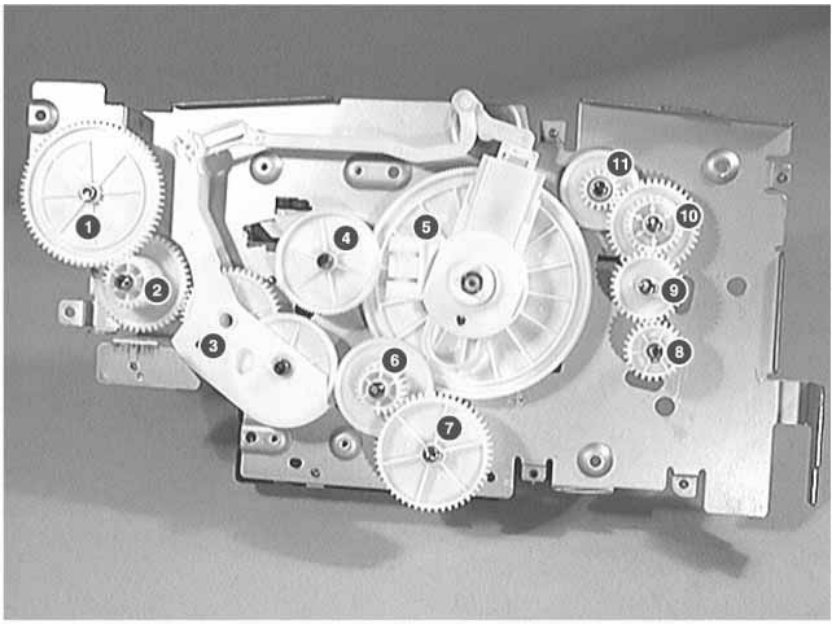
Printer Drive Assembly Gear Removal

- Remove the following assemblies:
- Remove the printer drive assembly. (See “Printer Drive Assembly Removal” (page 204) for instructions.
- Remove the main motor. (See “Main Motor Removal” (page 206)for instructions.)
- Remove the motor plate. (See “Motor Plate Removal” (page 207) for instructions.)

4 Remove any gear shown in figure 7-78 by following the steps listed below:

Gear	First Remove Gear(s)
1	N/A
2	1
3	N/A
4	N/A
5	7, 6, and 4
6	7
7	N/A
8	N/A
9	N/A
10	9
11	10 and 9

Figure 7-78 Printer Drive Assembly



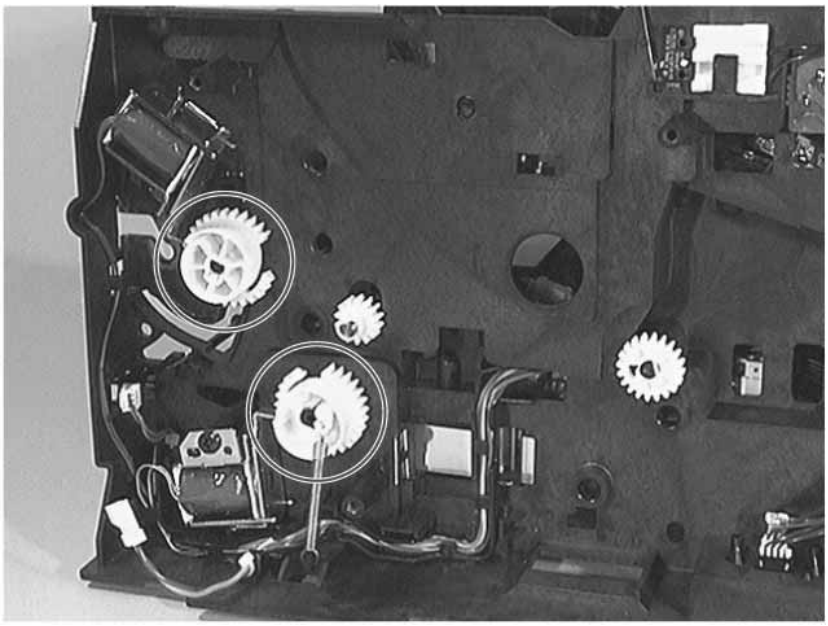
Tray 1 Pickup Roller Assembly Removal

1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the left cover. (See “Left Cover Removal” (page 229) for instructions.)
- Remove Tray 1. (See “Tray 1 Removal” (page 234) for instructions.)
- Remove the formatter PCB. (See “Formatter PCB Removal” (page 174) for instructions.)
- Remove the printer drive assembly. (See “Printer Drive Assembly Removal” (page 204) for instructions.)

2 Remove the gear shown in figure 7-79. Rotate it to get it past the solenoid.

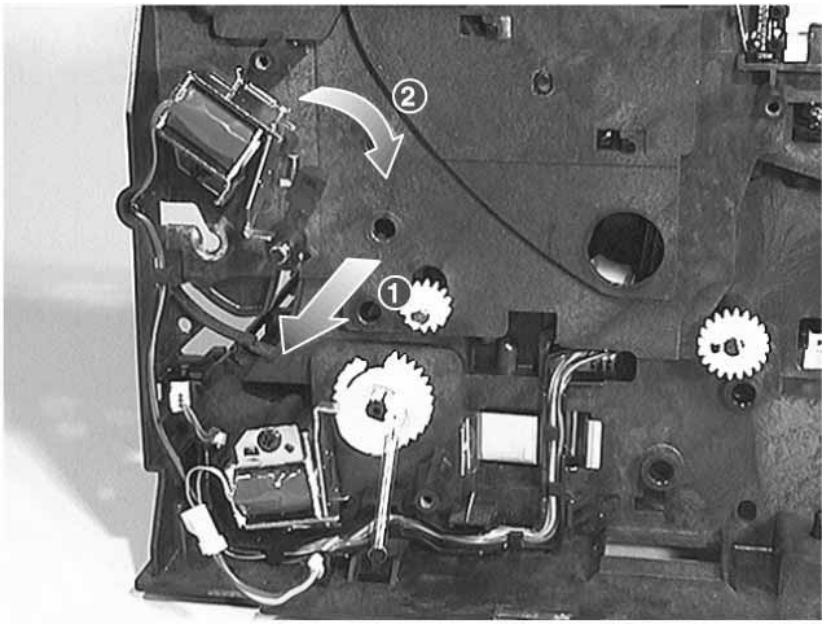
Figure 7-79 Removing Tray 1 Pickup Roller Assembly Gear



3 Remove the black bushing shown in figure 7-80. While facing it, pull out its lever and

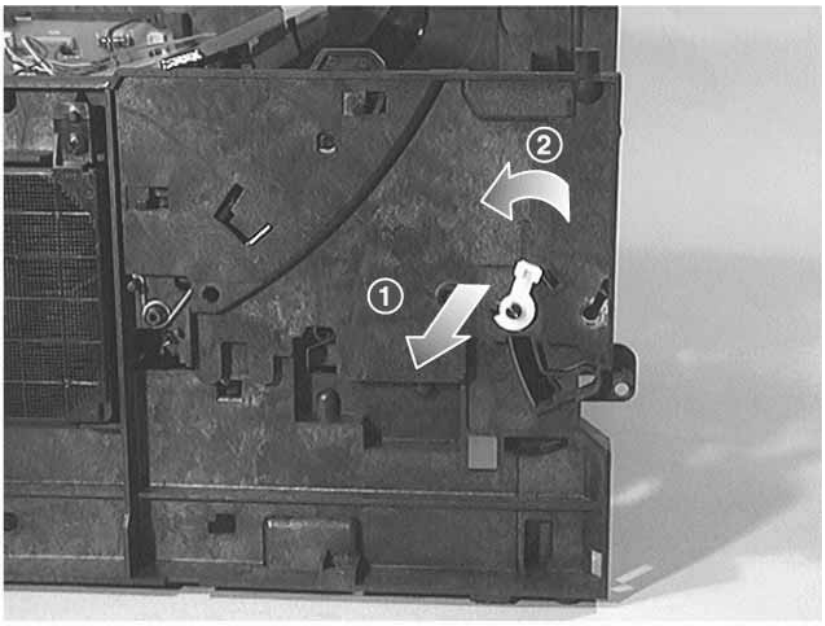
rotate it clockwise until the tab clears the keyed opening.

Figure 7-80 Removing Tray 1 Pickup Roller Assembly Black Bushing



4 Remove the white bushing shown in figure 7-81. While facing it, pull out its lever and rotate it counter clockwise until the tab clears the keyed opening.

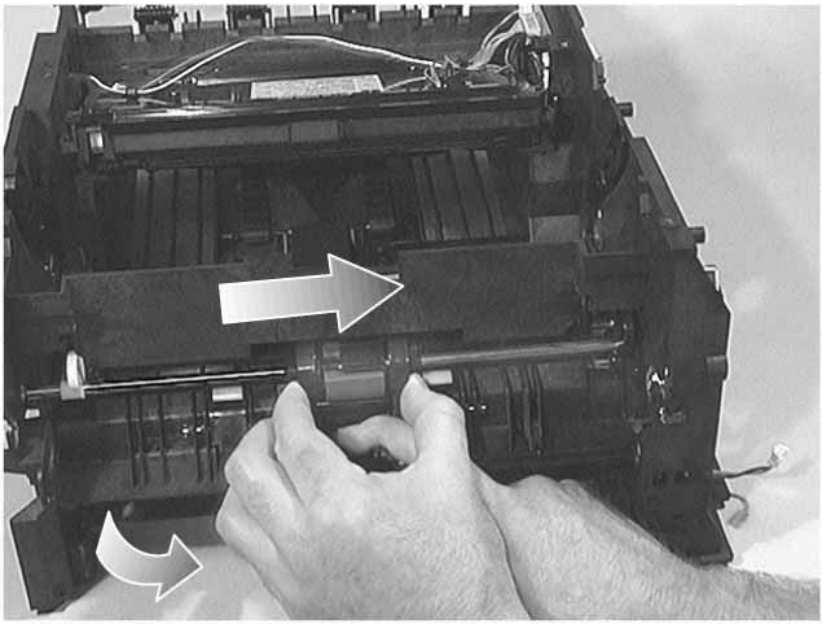
Figure 7-81 Removing Tray 1 Pickup Roller Assembly White Bushing



5 Slide the assembly to the right until the left end of the shaft clears the opening, and then

slide the assembly back to the left to remove it.

Figure 7-82 Removing Tray 1 Pickup Roller Assembly



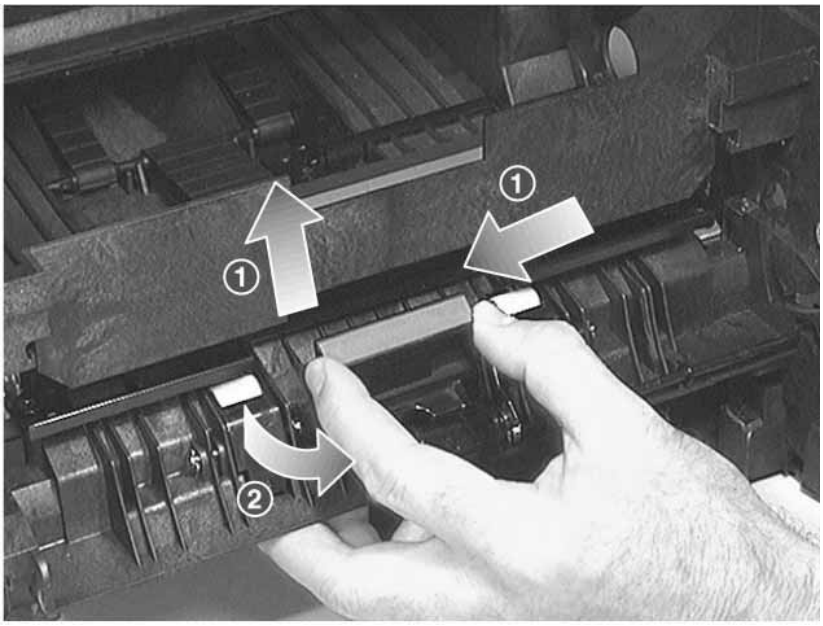
Tray 1 Separation Pad Assembly Removal

1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the left cover. (See “Left Cover Removal” (page 229) for instructions.)
- Remove Tray 1. (See “Tray 1 Removal” (page 234) for instructions.)
- Remove the Tray 1 pickup roller assembly. (See “Tray 1 Pickup Roller Assembly Removal” (page 209) for instructions.)

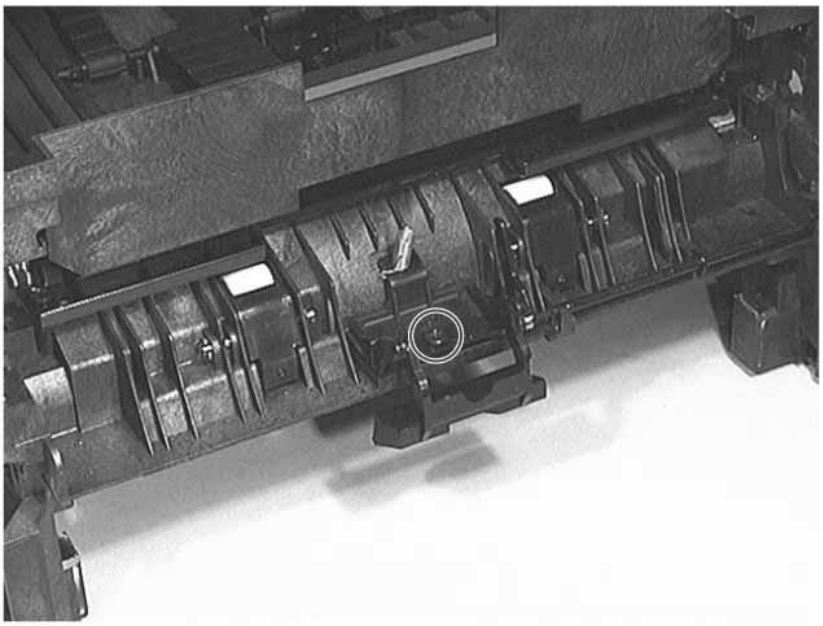
2 To rotate the separation pad forward, simultaneously lift it up and to the left.

Figure 7-83 Rotating the Separation Pad



3 Remove the screw shown in figure 7-84, and then lift the assembly to remove it.

Figure 7-84 Removing the Separation Pad Assembly



Tray 1 Paper Sensor Lever Removal

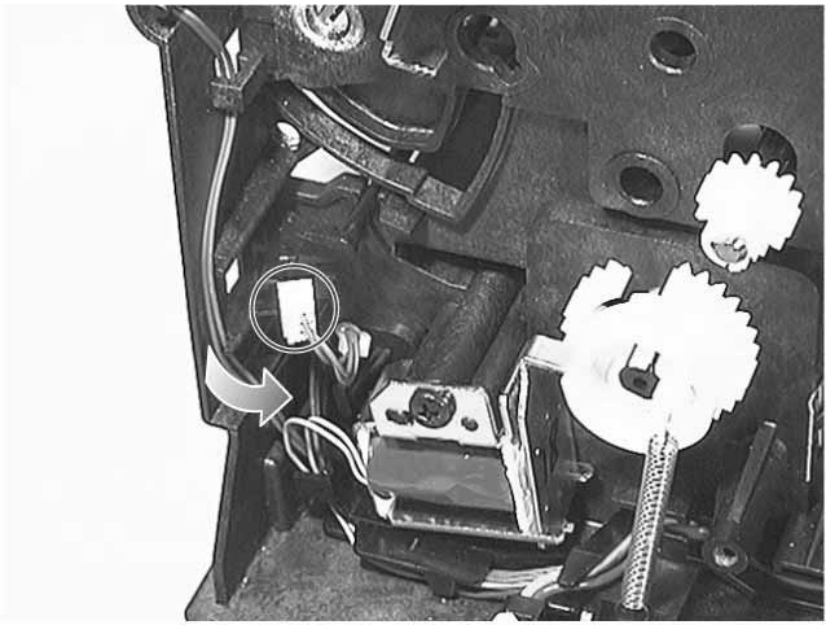
1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the left cover. (See “Left Cover Removal” (page 229) for instructions.)
- Remove Tray 1. (See “Tray 1 Removal” (page 234) for instructions.)
- Remove the formatter PCB. (See “Formatter PCB Removal” (page 174) for instructions.)
- Remove the printer drive assembly. (See “Printer Drive Assembly Removal” (page 204) for instructions.)

2 Rotate the paper sensor lever forward until it stops, and then hold it in this position.

3 Grasp the wire connector shown in figure 7-85, and then pivot it toward the printer to remove it.

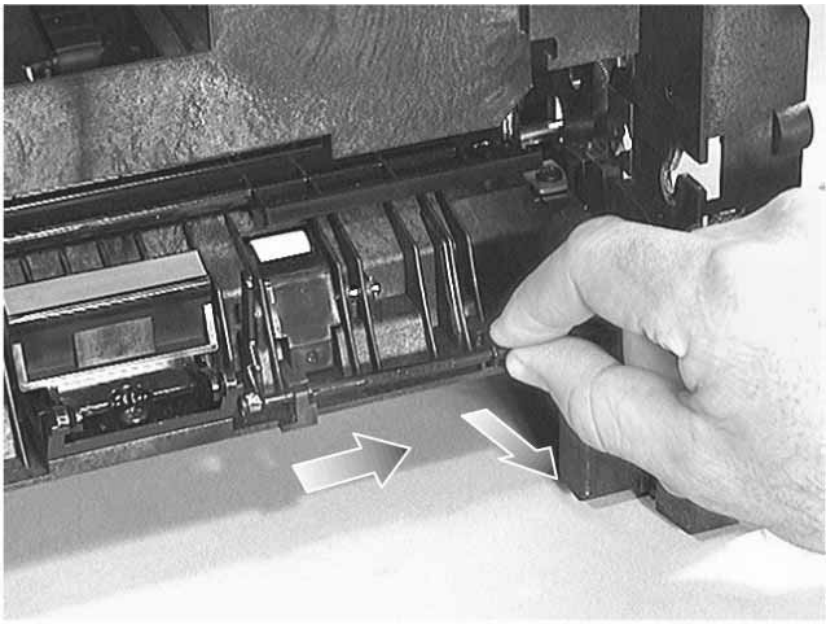
Figure 7-85 Removing the Optic Sensor



4 Pull the center of the paper sensor lever outward (see figure 7-86), and then slide it to

the right until it stops.

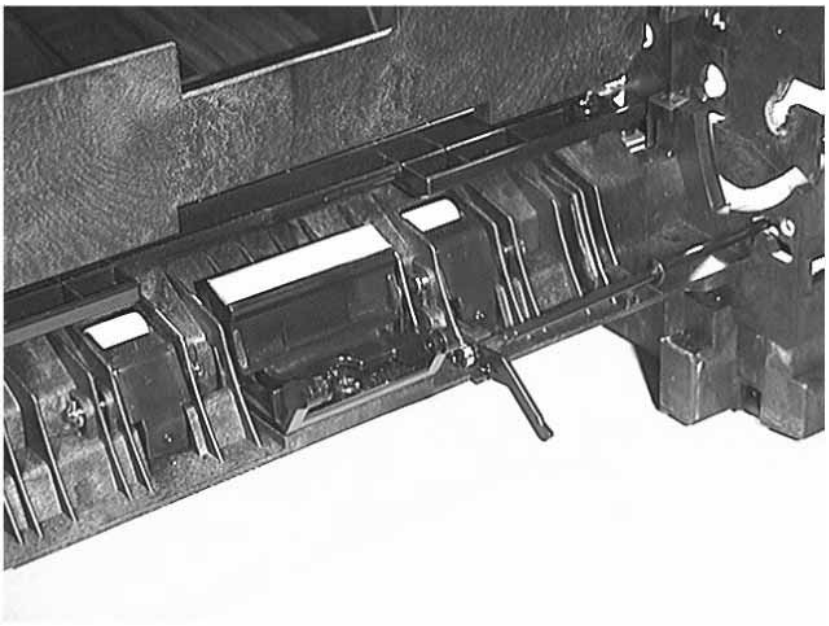
Figure 7-86 Sliding the Paper Sensor Lever to the Right



5 Rotate the paper sensor lever until it is facing downward (see figure 7-87).

6 Lift the paper sensor lever to remove it.

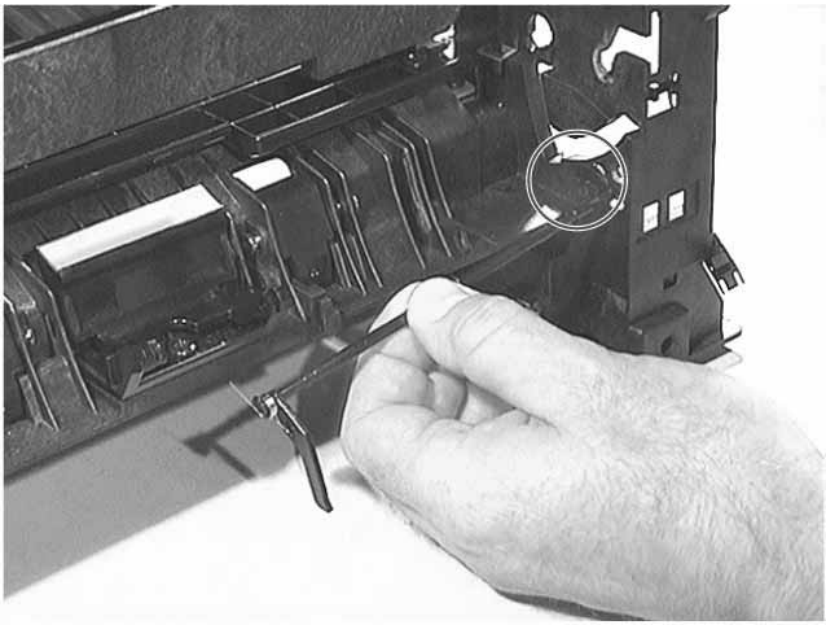
Figure 7-87 Removing the Paper Sensor Lever



Tray 1 Paper Sensor Lever Replacement

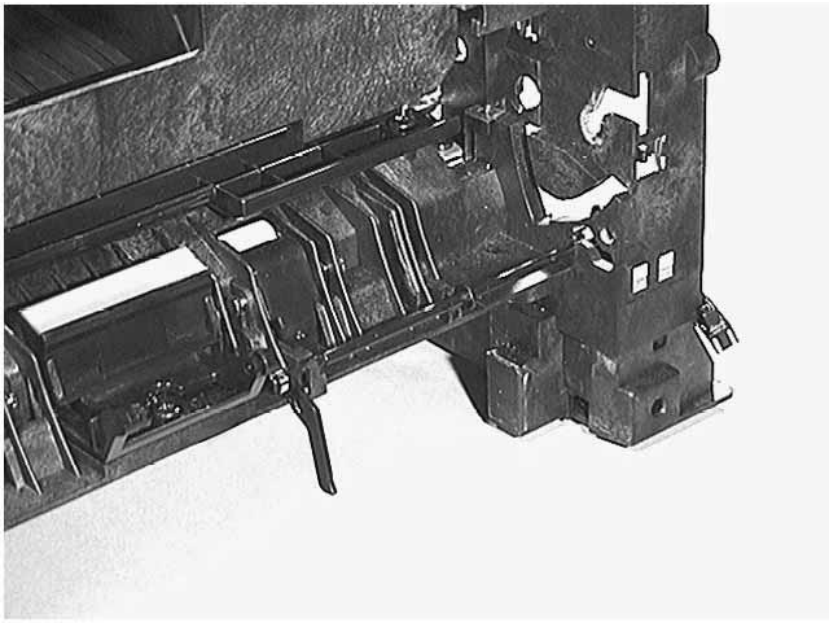
1 Insert the paper sensor lever through the printer opening as shown in figure 7-88.

Figure 7-88 Inserting Paper Sensor Lever through Printer Opening



2 Set the paper sensor lever in its cradle as shown in figure 7-89. Make sure the spring is resting on the bottom of the printer.

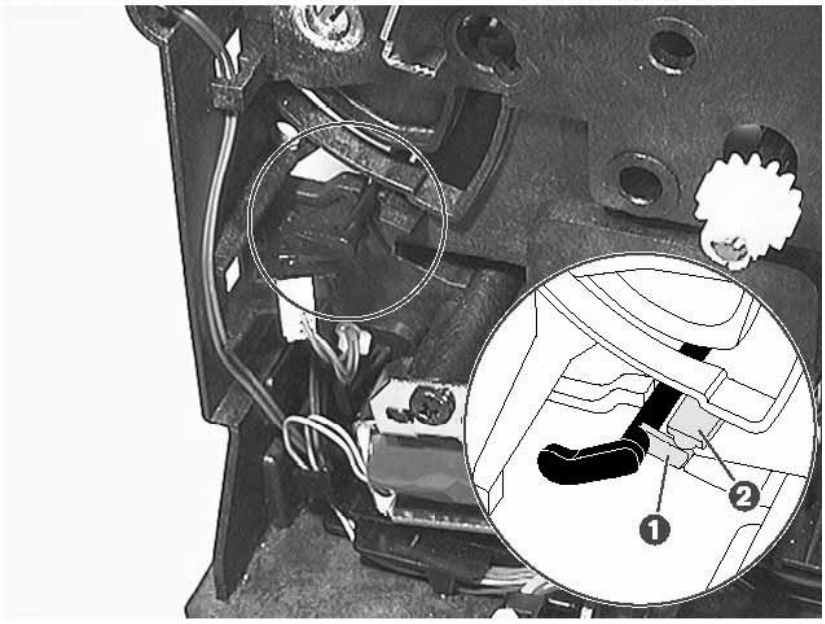
Figure 7-89 Setting the Paper Sensor Lever in its Cradle



3 Rotate the paper sensor lever forward so that the catch (1) will just clear the stop (2)

shown in figure 7-90.

Figure 7-90 Rotating the Paper Sensor Lever



4 Pull the middle of the paper sensor lever outward, and then slide it to the right until it locks in place.

5 Rotate the paper sensor lever forward until it stops, and then hold it in this position.

6 To replace the electrical sensor insert the left prongs first into the opening.

Tray 1 Solenoid Removal

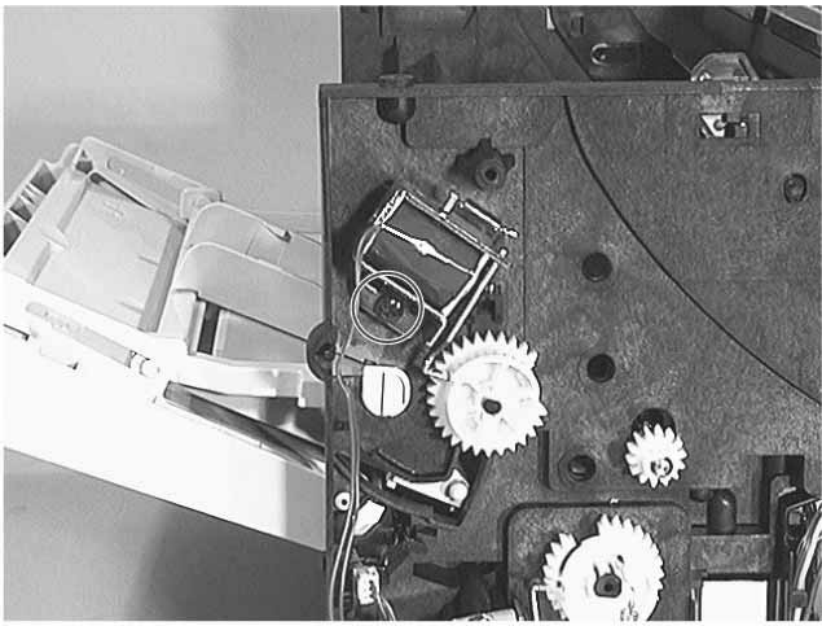
1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the formatter PCB. (See “Formatter PCB Removal” (page 174) for instructions.)
- Remove the printer drive assembly. (See “Printer Drive Assembly Removal” (page 204) for instructions.
- Disconnect the solenoid’s power cable from the engine controller assembly. (See “Engine Controller Assembly Removal” (page 186) for instructions.)

2 Remove the solenoid’s power cable from the cable harness, and then pull the connector through the opening.

3 Remove the screw shown in figure 7-91.

Figure 7-91 Removing Tray 1 Solenoid



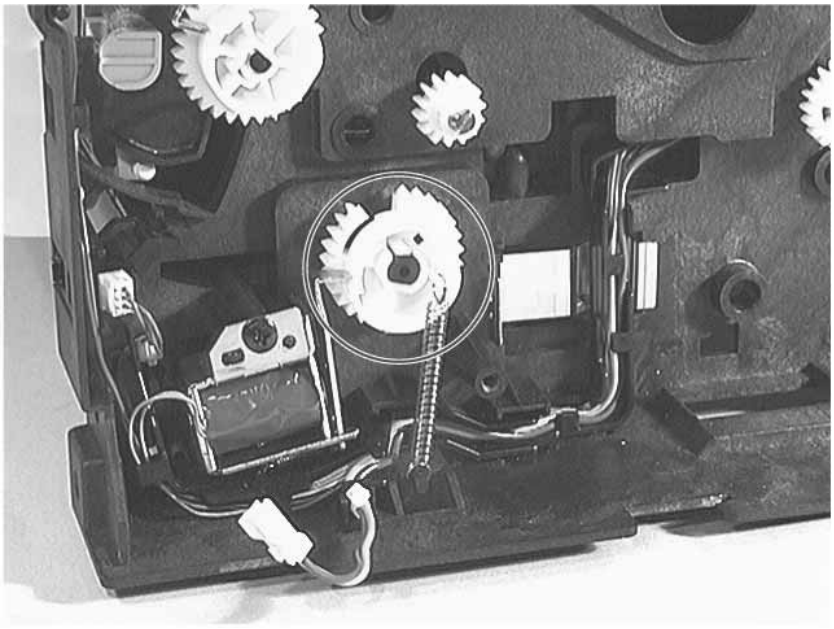
Tray 2 Pickup Roller Assembly Removal

1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the formatter PCB. (See “Formatter PCB Removal” (page 174) for instructions.)
- Remove the printer drive assembly. (See “Printer Drive Assembly Removal” (page 204) for instructions.

2 Remove the spring and gear shown in figure 7-92. Rotate the gear in order to get it past the solenoid.

Figure 7-92 Removing Tray 2 Pickup Roller Assembly Gear

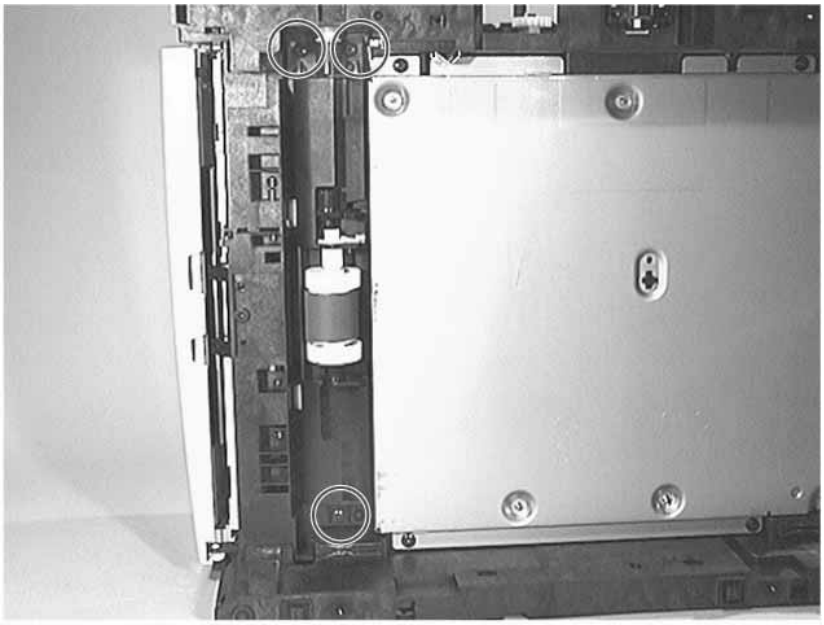


3 Place the printer on its left side.

4 Remove the three screws shown in figure 7-93.

5 Lift one end of the assembly to remove it.

Figure 7-93 Removing Tray 2 Pickup Roller Assembly



Tray 2 Solenoid Removal

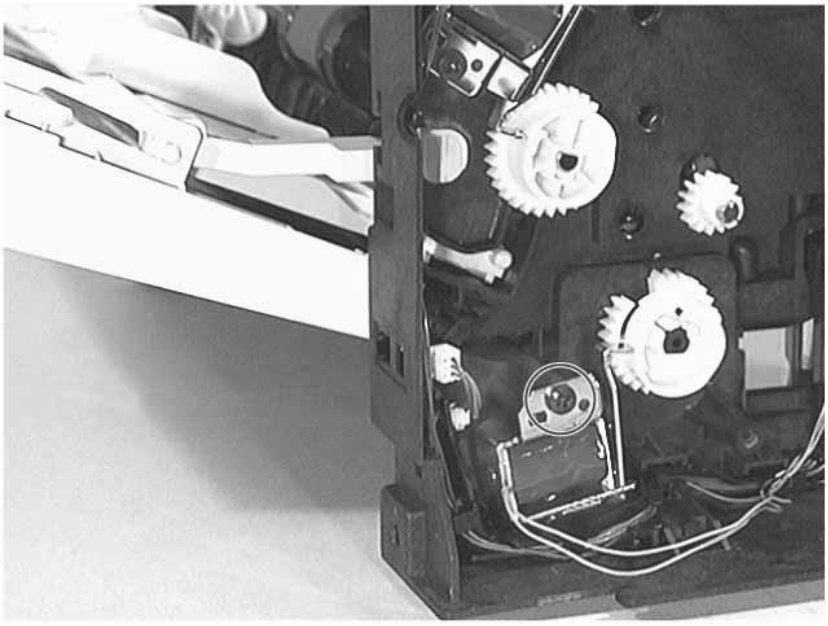
1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the formatter PCB. (See “Formatter PCB Removal” (page 174) for instructions.)
- Remove the printer drive assembly. (See “Printer Drive Assembly Removal” (page 204) for instructions.
- Disconnect the solenoid’s power cable from the engine controller assembly. (See “Engine Controller Assembly Removal” (page 186) for instructions.)

2 Remove the solenoid’s power cable from the cable harness, and then pull the connector through the opening.

3 Remove the screw shown in figure 7-94.

Figure 7-94 Removing Tray 2 Solenoid



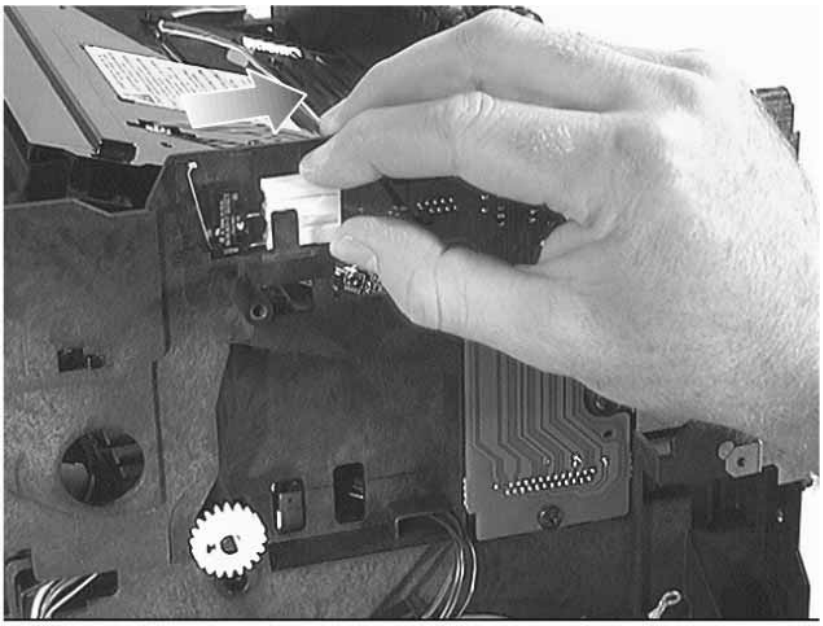
Intermediate PCB Removal

1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove Tray 2. (See “Tray 2 Removal” (page 157) for instructions.)
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the formatter PCB. (See “Formatter PCB Removal” (page 174) for instructions.)
- Remove the printer drive assembly. (See “Printer Drive Assembly Removal” (page 204) for instructions.

2 Disconnect the door sensor cable at the location shown in figure 7-95.

Figure 7-95 Disconnecting Door Sensor Cable



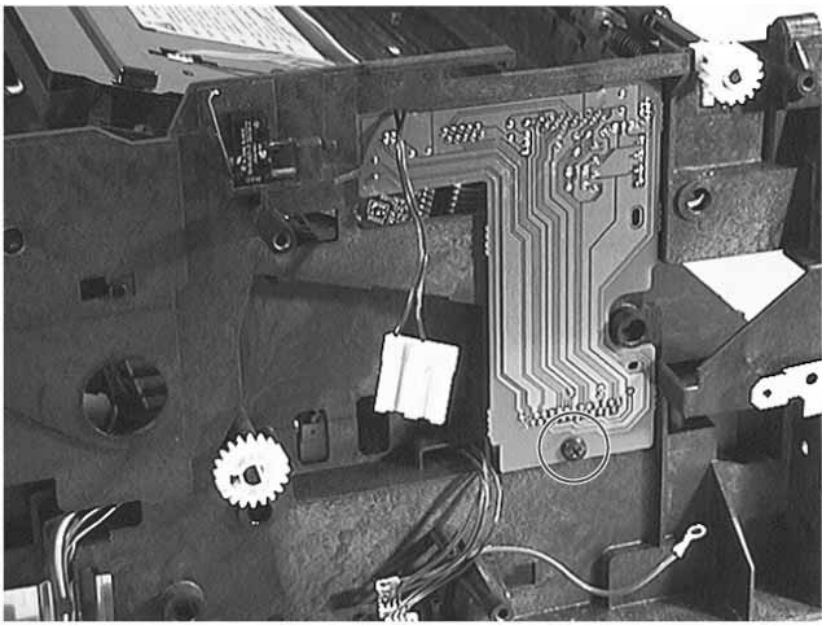
3 Disconnect the power cables from the laser scanner and the cooling fan at the location

shown in figure 7-96.

Figure 7-96 Disconnecting Laser Scanner's and Fan's Power Cable

4 Remove the screw shown in figure 7-97.

Figure 7-97 Removing the Intermediate PCB's screw

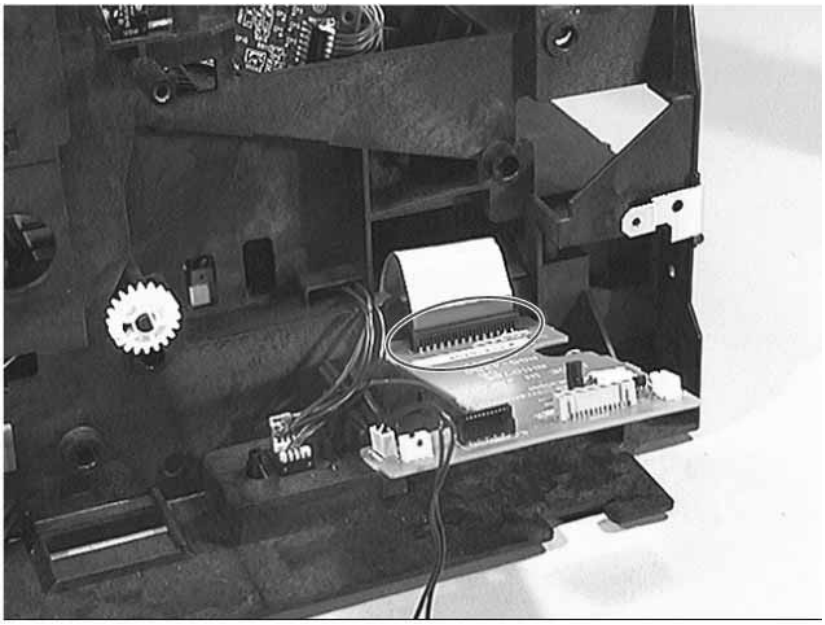


5 Disconnect the ribbon cable shown in figure 7-98.

Do not pull the ribbon cable out of the frame if the engine controller assembly is also

removed. Otherwise, the ribbon cable must be threaded back through the frame.

Figure 7-98 Disconnecting the Intermediate PCB's Ribbon Cable



6 Remove the intermediate PCB.

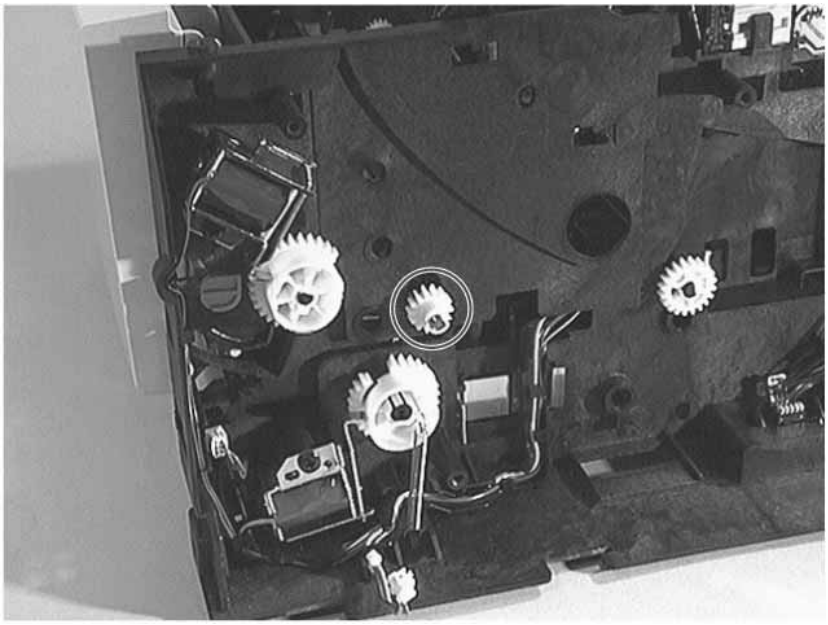
Registration Assembly Removal

1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the formatter PCB assembly. (See “Formatter PCB Removal” (page 174) for instructions.)
- Remove the printer drive assembly. (See “Printer Drive Assembly Removal” (page 204) for instructions.

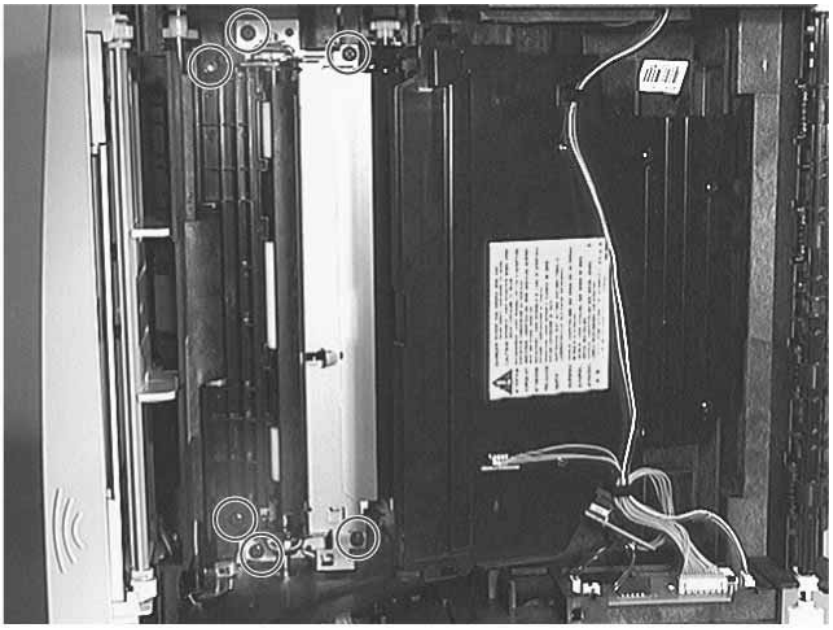
2 Remove the gear shown in figure 7-99.

Figure 7-99 Removing Registration Assembly Gear



3 Remove the six screws shown in figure 7-100.

Figure 7-100Removing the Registration Assembly's Screws



4 To remove the registration assembly slide it to the right, and then lift the right end of it.

Fusing Assembly Ground Clip Replacement

1 Remove the following assemblies:

- Remove the fusing assembly. (See “Fusing Assembly Removal” (page 179) for instructions.)
- Remove the engine controller assembly. (See “Engine Controller Assembly Removal” (page 186) for instructions.

2 Orient the ground clip as shown in figure 7-101, and then place it over the guide pins as shown in figure 7-102.

Figure 7-101Replacing the Fusing Assembly Ground Clip

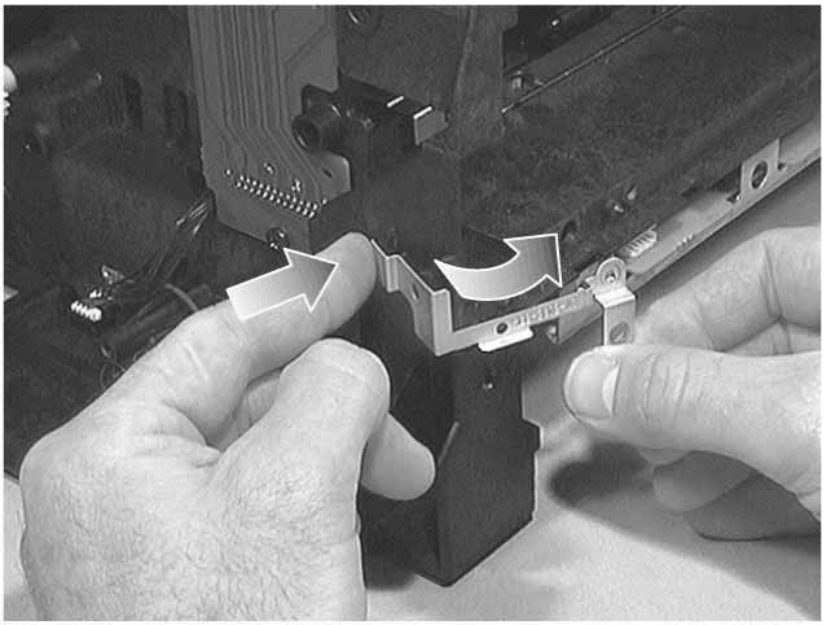
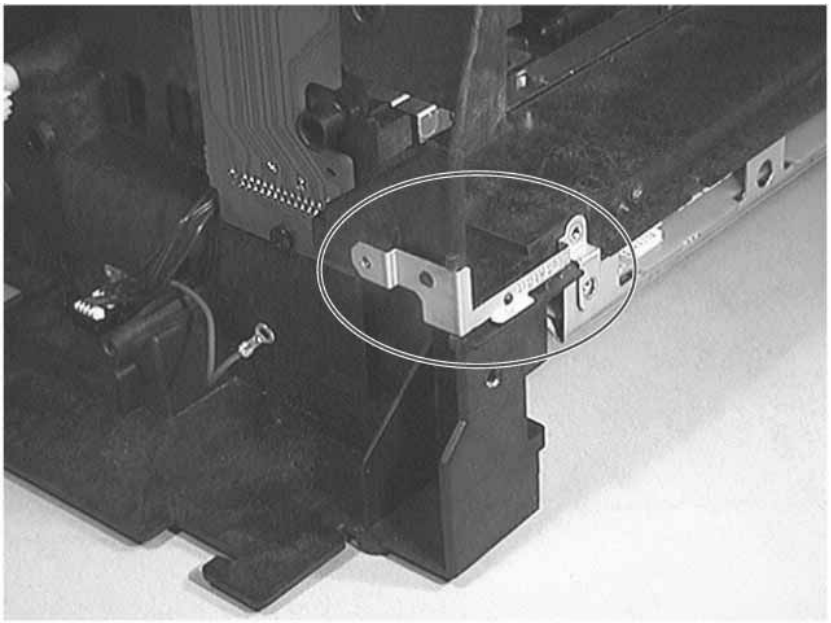


Figure 7-102Fusing Assembly Ground Clip



Tray 3 Assembly Connector Removal

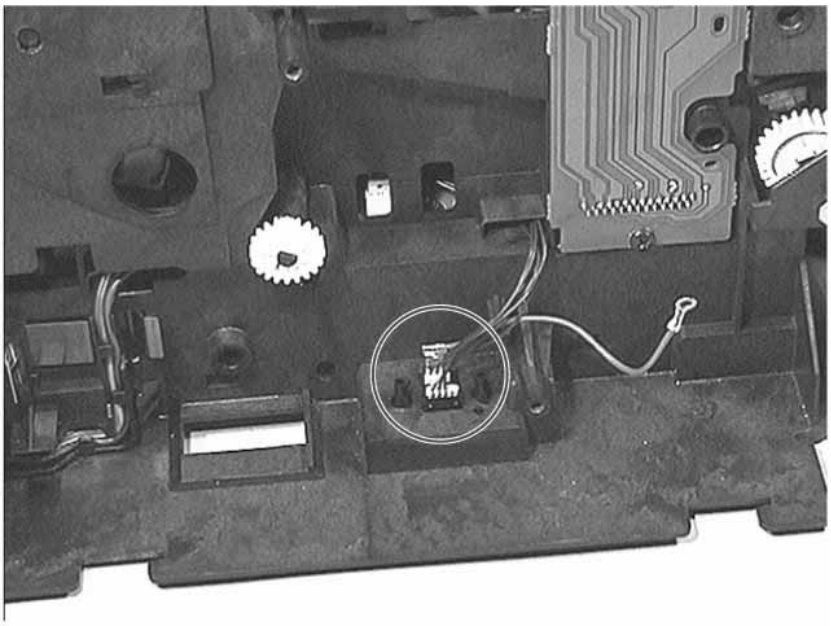
1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove Tray 2. (See “Tray 2 Removal” (page 157) for instructions.)
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the formatter PCB. (See “Formatter PCB Removal” (page 174) for instructions.)
- Remove the printer drive assembly. (See “Printer Drive Assembly Removal” (page 204) for instructions.

2 Disconnect the wires at the location shown in figure 7-103.

3 To remove the connector shown in figure 7-103 squeeze the wing nuts with needle nose pliers, and then push the connector through the opening.

Figure 7-103Removing Tray 3 Connector



Left Cover Removal

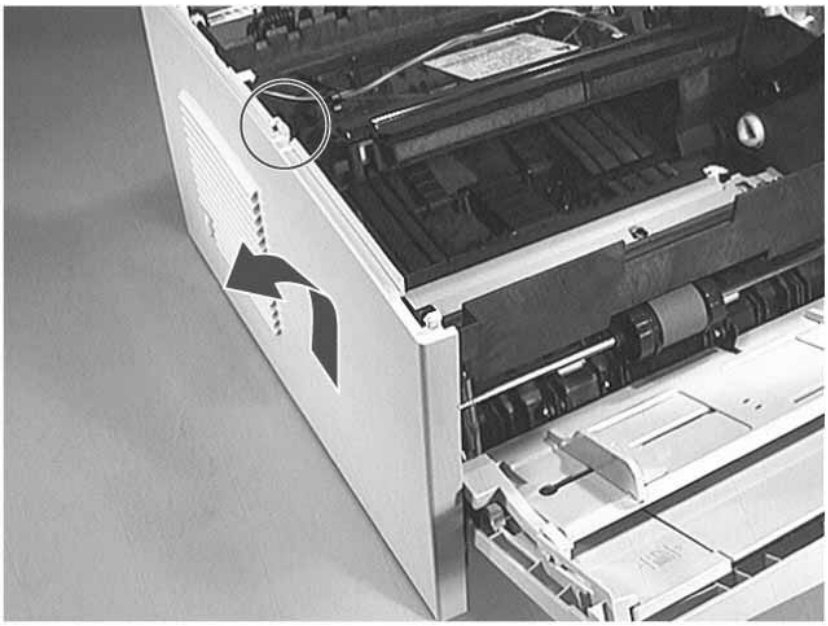
1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)

2 Release the latch shown in figure 7-104.

3 Simultaneously lift the cover up and outward.

Figure 7-104Releasing the Latch on the Left Cover



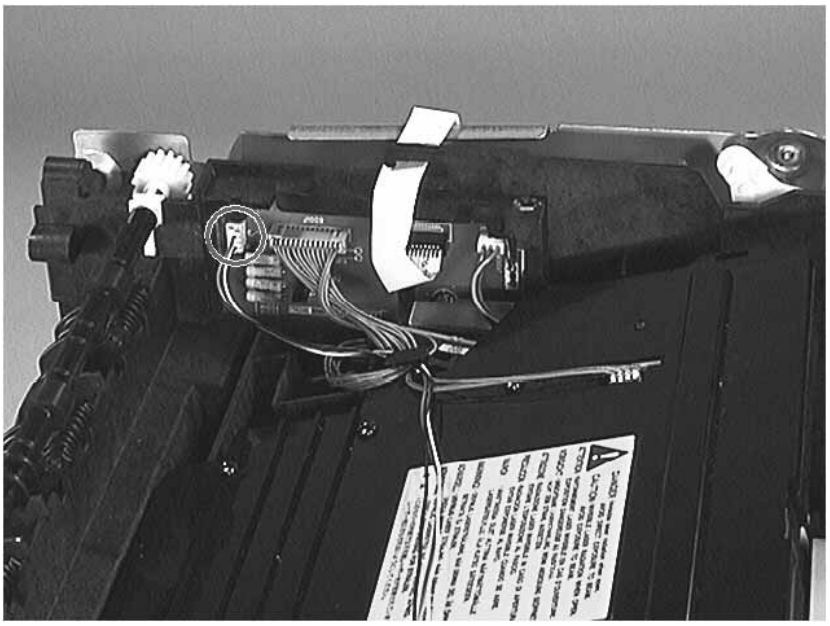
Cooling Fan Removal

1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the left cover. (See “Left Cover Removal” (page 229) for instructions.)

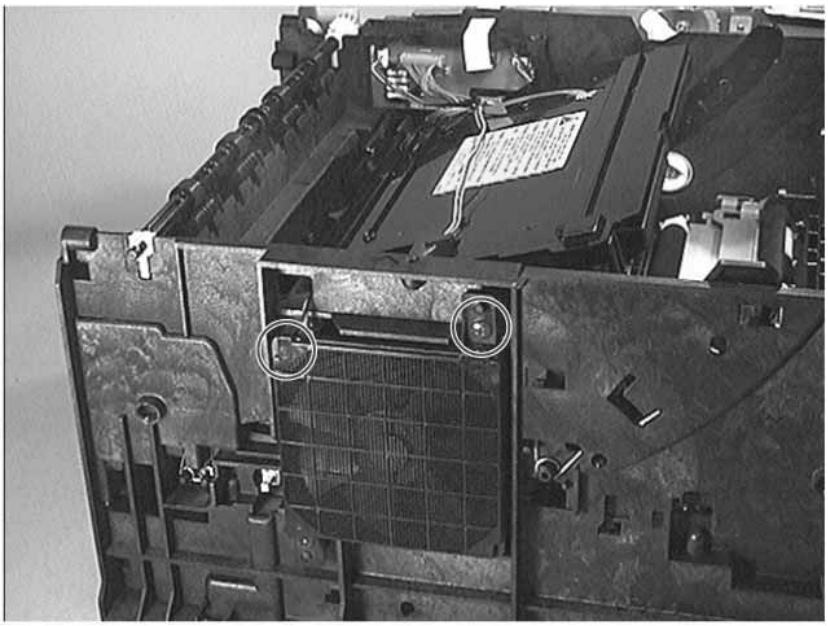
2 Disconnect the power cable from the cooling fan at the location shown in figure 7-105.

Figure 7-105 Disconnecting the Cooling Fan’s Power Cable



3 Remove the two screws shown in figure 7-106.

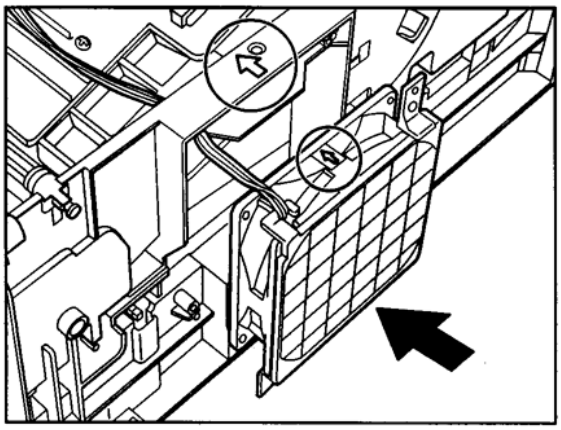
Figure 7-106 Removing the Cooling Fan



4 Remove the fan.

NOTE: When replacing the fan, make sure the surface with the label faces inside, and the arrow mark on the fan and printer point in the same direction as shown in figure 7-107.

Figure 7-107 Replacing the Fan



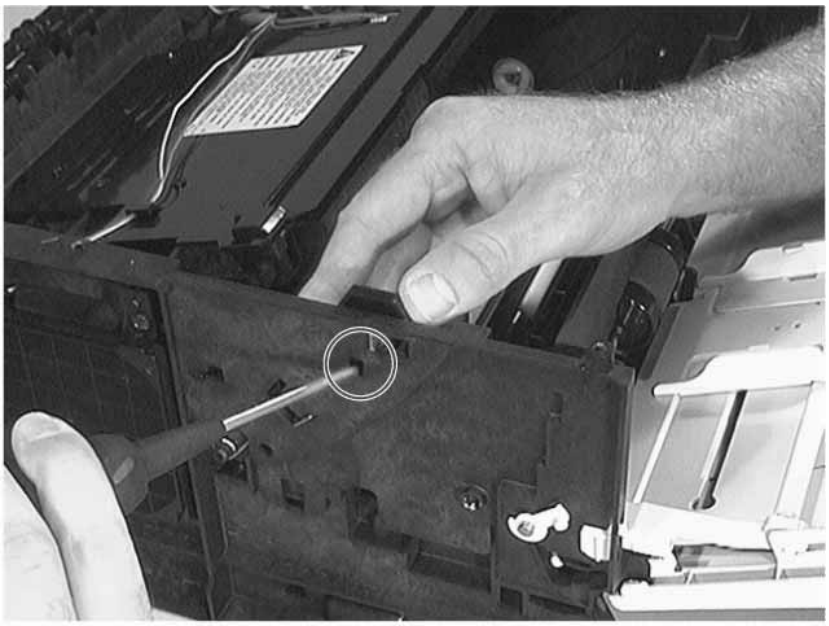
Toner Cartridge Guide Removal

1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove Tray 2. (See “Tray 2 Removal” (page 157) for instructions.)
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the left cover. (See “Left Cover Removal” (page 229) for instructions.)

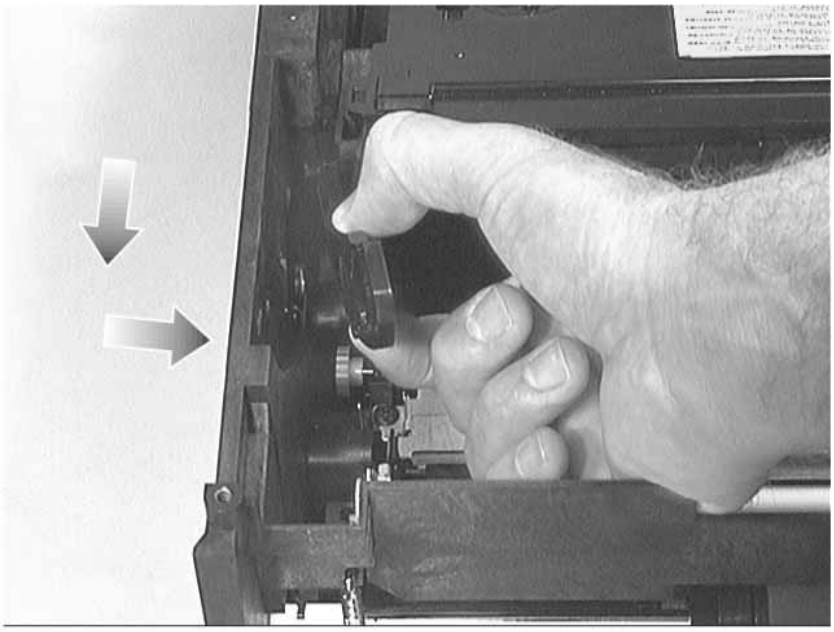
2 Press and hold the tab shown in figure 7-108.

Figure 7-108Releasing the Toner Cartridge Guide



3 Slide the guide up and out to remove it (see figure 7-109).

Figure 7-109Removing the Toner Cartridge Guide.



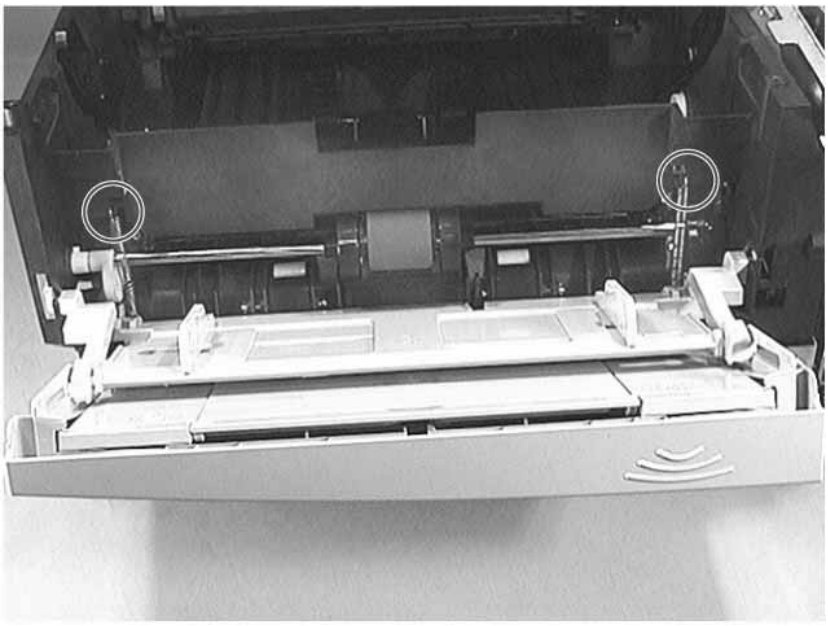
Tray 1 Removal

1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the left cover. (See “Left Cover Removal” (page 229) for instructions.)

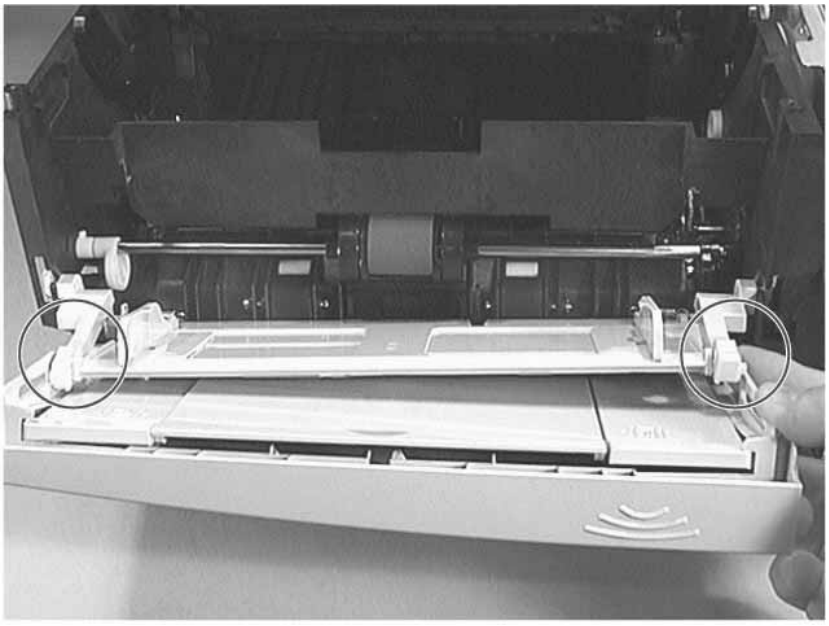
2 Disconnect the springs from the printer at the locations shown in figure 7-110.

Figure 7-110Disconnecting Tray 1’s Springs



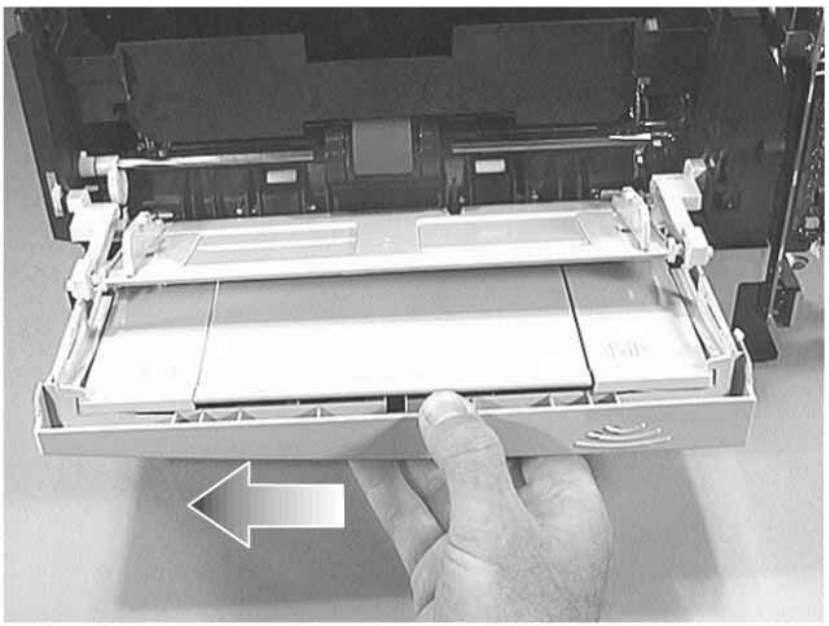
3 Disconnect the pivot arms from Tray 1 at the locations shown in figure 7-111.

Figure 7-111 Disconnecting Tray 1's Pivot Arms



4 Remove Tray 1's bottom piece by sliding it to the left.

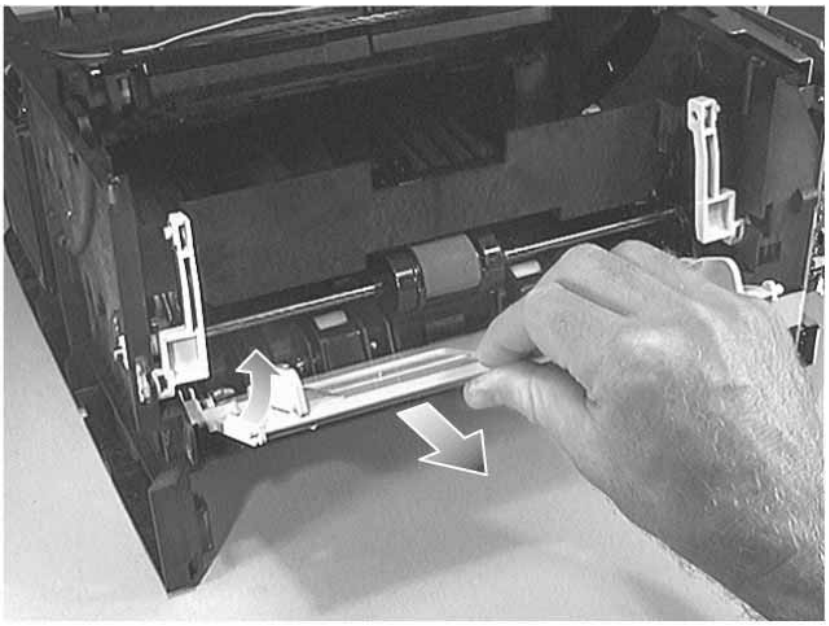
Figure 7-112 Separating Tray 1's Bottom Piece



5 Rotate the pivot arms to the upward position as shown in figure 7-113.

6 Remove Tray 1's top piece (see figure 7-113).

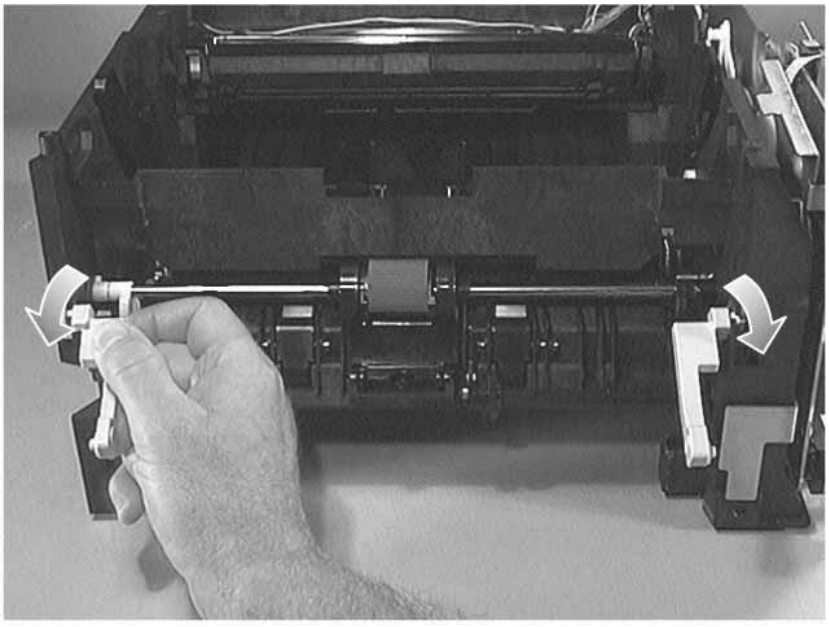
Figure 7-113 Removing Tray 1's Top Piece



7 Rotate the pivot arms to the downward position as shown in figure 7-114.

8 Remove the pivot arms.

Figure 7-114 Removing Tray 1's Pivot Arms



NOTE: Each pivot arm is marked with either the letter L or R, to indicate which side of the printer to replace it on.

Tray 1 Pickup Roller Removal

Be careful not to damage the paper sensor lever while removing the Tray 1 pickup roller.

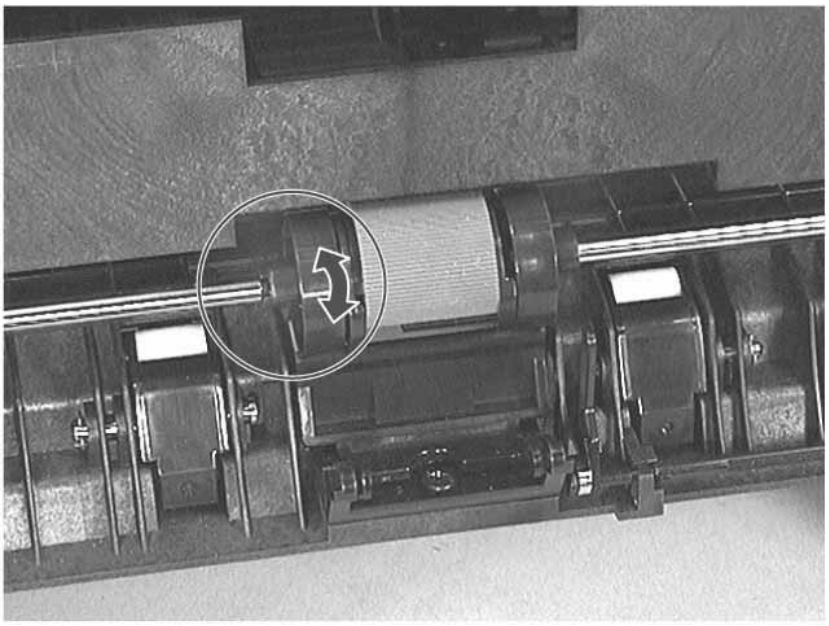
The Tray 1 Pickup Roller Assembly is a field replaceable unit. See “Tray 1 Pickup Roller Assembly Removal” (page 209) for more information.

1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the left cover. (See “Left Cover Removal” (page 229) for instructions.)
- Remove Tray 1. (See “Tray 1 Removal” (page 234) for instructions.)

2 Rotate the left idler roller so that its release mechanism is accessible (see figure 7-115).

Figure 7-115Release Mechanism on Idler Roller

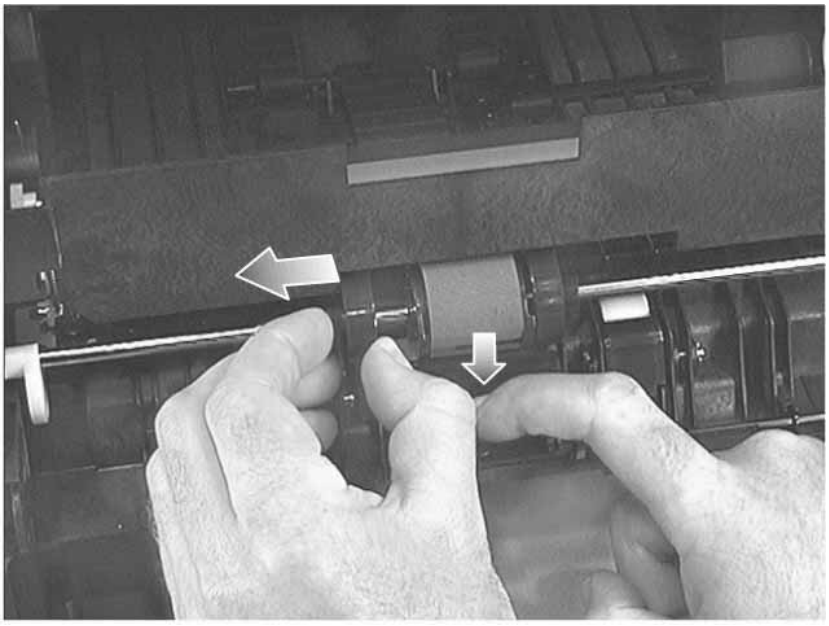


3 Press and hold down the separation pad (see figure 7-116).

4 Press and hold the release button, and then slide the idler roller to the left (see figure 7-116).

5 Repeat step 7 through step 9 to move the right idler roller.

Figure 7-116 Repositioning the Idler Roller



6 Press and hold the release mechanism (see figure 7-117) on the pickup roller, and then slide it to the right (see figure 7-118).

7 Rotate the pickup roller downward to remove it.

Figure 7-117Pickup Roller Release Mechanism

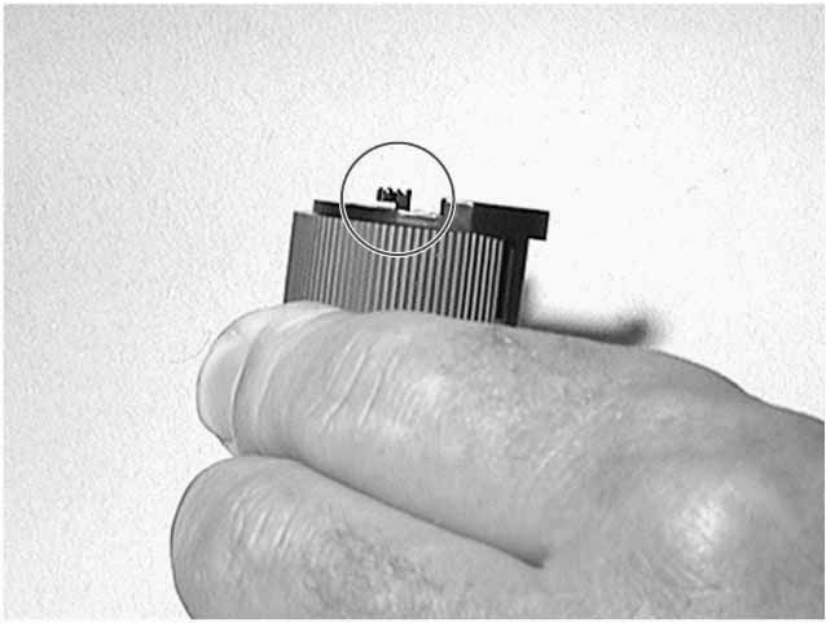
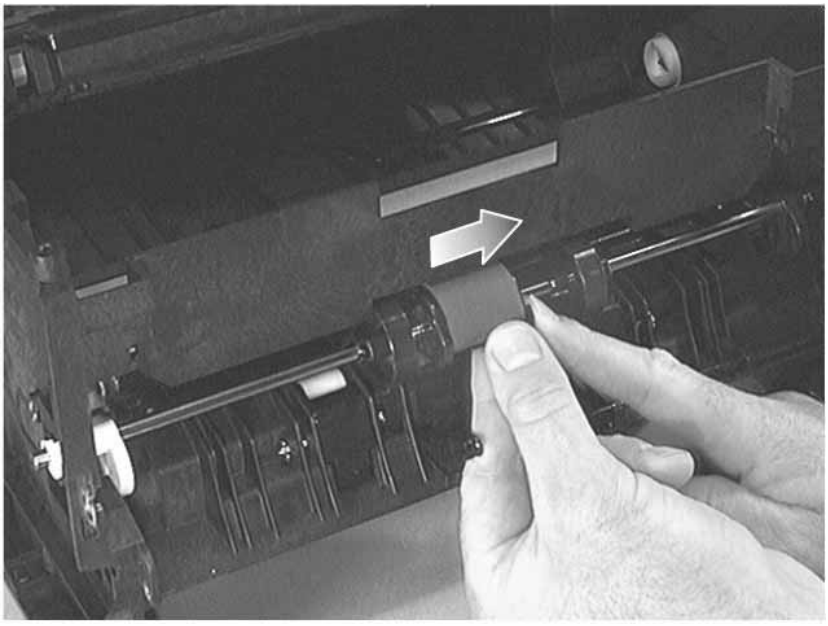


Figure 7-118Removing the Tray 1 Pickup Roller



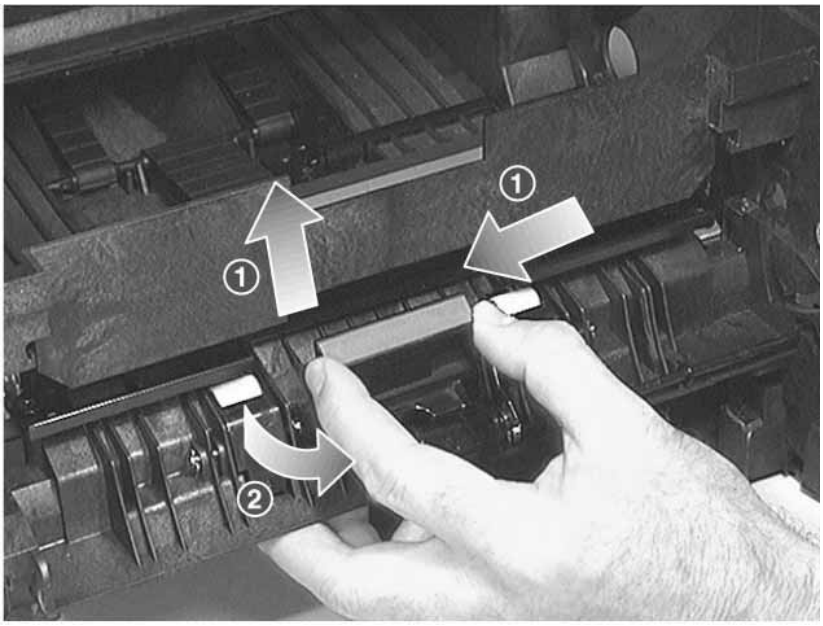
Tray 1 Separation Pad Removal

1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)
- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the left cover. (See “Left Cover Removal” (page 229) for instructions.)
- Remove Tray 1. (See “Tray 1 Removal” (page 234) for instructions.)
- Remove the Tray 1 pickup roller assembly. (See “Tray 1 Pickup Roller Assembly Removal” (page 209) for instructions.)

2 To rotate the separation pad forward, simultaneously lift it up and to the left.

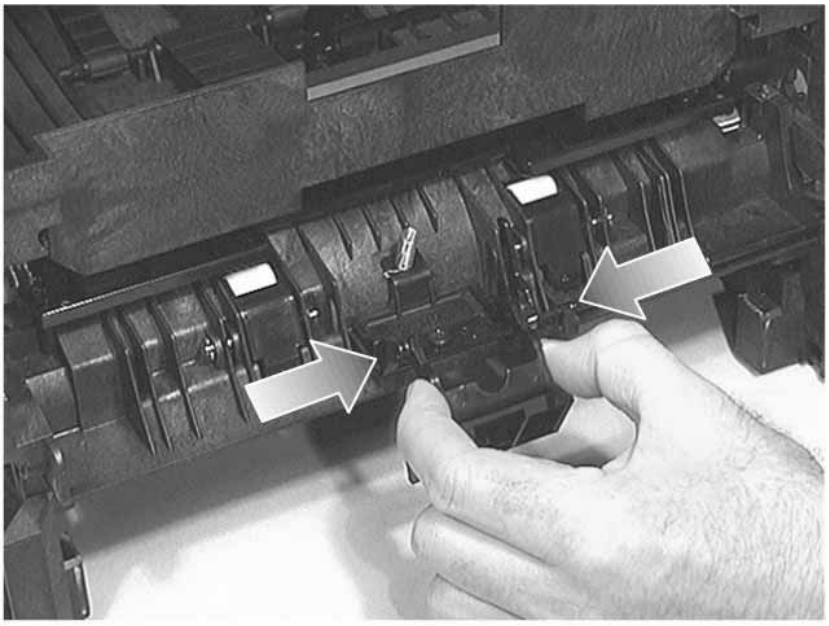
Figure 7-119Rotating the Separation Pad



3 Simultaneously squeeze both brackets to remove the separation pad from the swing

arms.

Figure 7-120Removing the Separation Pad



DC Bias Voltage Contacts (Leaf Springs) Removal

This procedure describes how to replace the high-voltage contacts shown in figure 7-121. figure 7-122 identifies each part of the contact as it is referred to in this procedure.

Figure 7-121DC Bias Voltage Contacts (Leaf Springs)

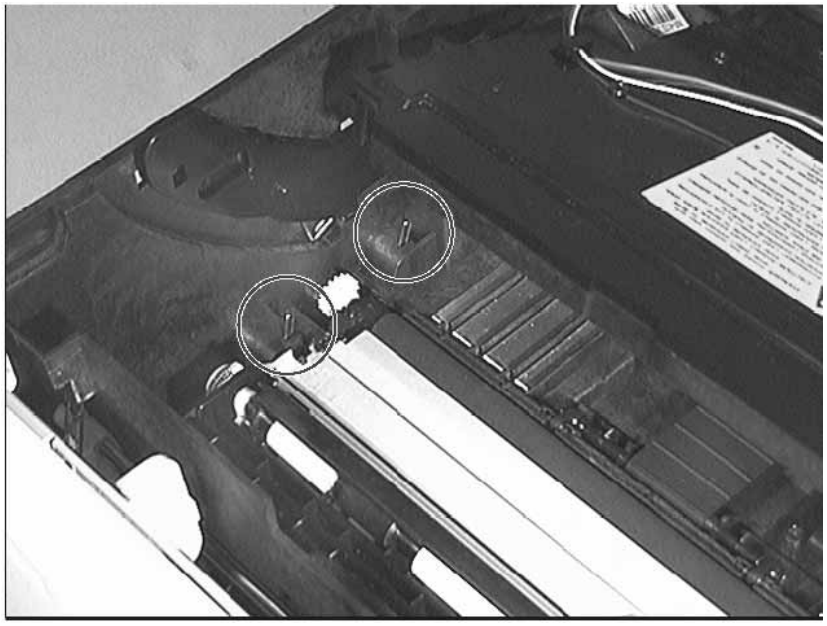
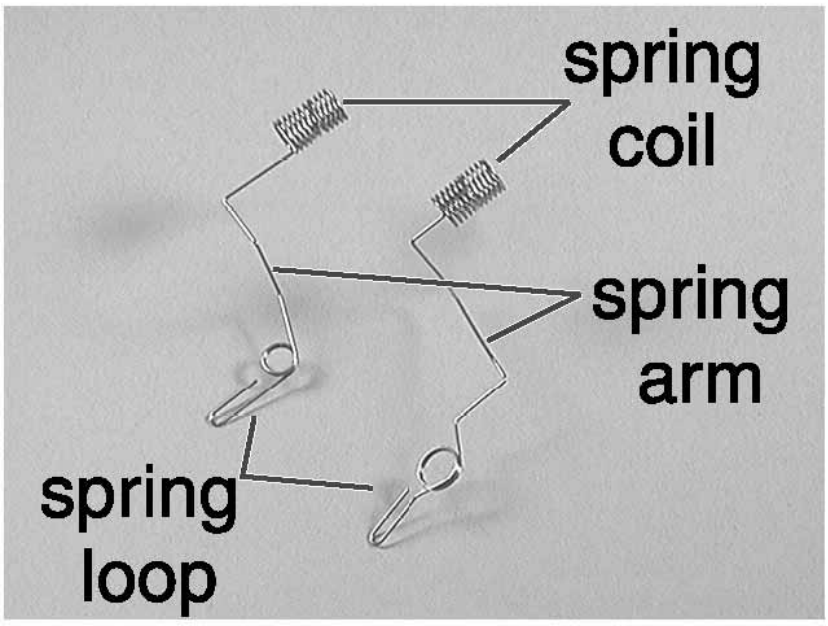


Figure 7-122Parts of the DC Bias Voltage Contacts (Leaf Springs)



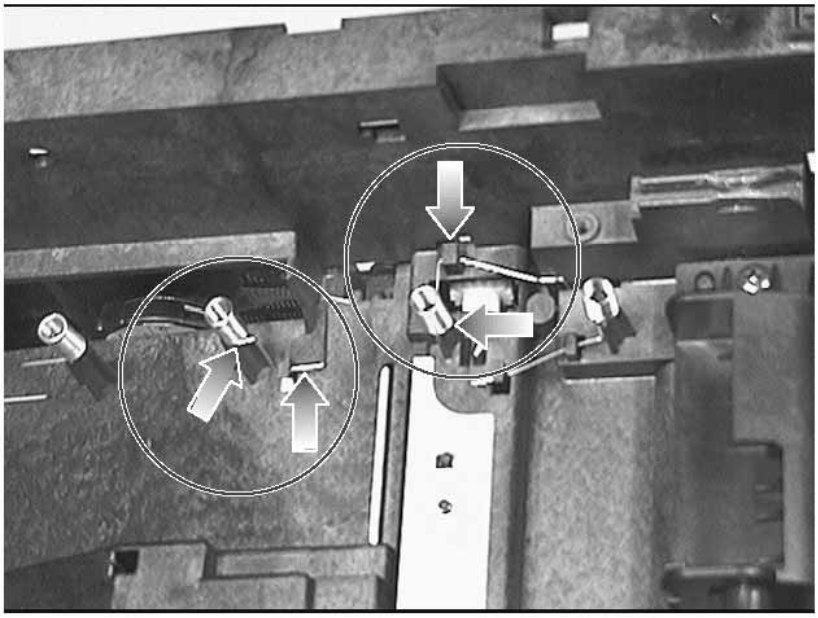
1 Remove the following assemblies:

- Remove the toner cartridge. (See “Toner Cartridge Removal” (page 156) for instructions.)
- Remove the DIMM cover. (See “DIMM Cover Removal” (page 172) for instructions.)
- Remove the rear cover. (See “Rear Cover Removal” (page 177) for instructions.)

- Remove the top cover. (See “Top Cover Removal” (page 189) for instructions.)
- Remove the left cover. (See “Left Cover Removal” (page 229) for instructions.)
- Remove the engine controller assembly. (See “Engine Controller Assembly Removal” (page 186) for instructions.)

2 Remove the spring coil from the retaining clip located on the bottom of printer, and then remove the spring arm from the retaining clip located on the bottom of printer.

Figure 7-123Removing the Spring Coil and Arm from the Retaining Clips

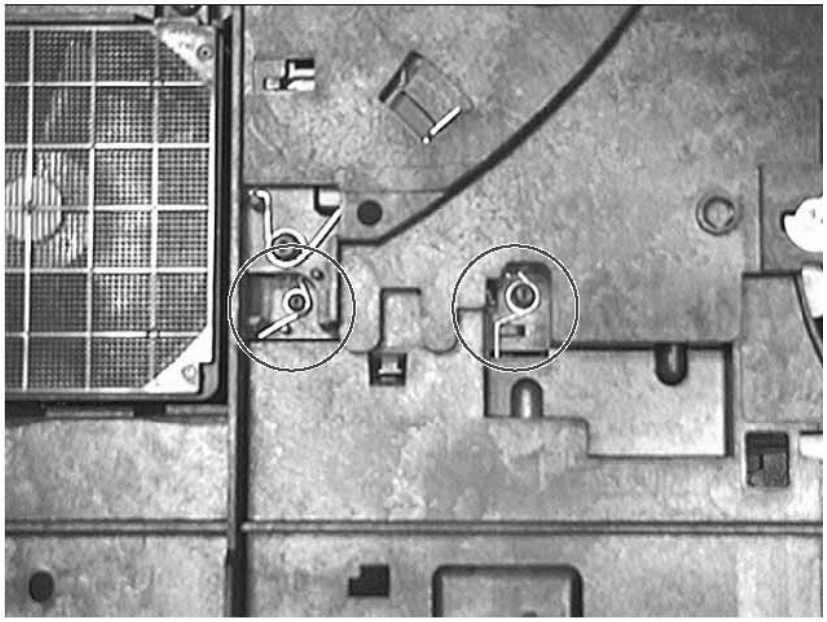


3 Remove the spring arm from the retaining clip located on the side of printer (see figure 7-124). This releases the tension on the spring.

4 Squeeze the spring loop, and then slide it up and out of its slot.

5 Remove the spring coil from the retaining clip located on the side of printer (see figure 7-124), and then pull the spring assembly out of the printer.

Figure 7-124Removing the Spring Arm and Coil from the Retaining Clips



DC Bias Voltage Contacts Replacement

1 Insert the spring through either the opening shown in figure 7-125 or figure 7-126.

Figure 7-125Inserting the Spring through the Opening (1 of 2)

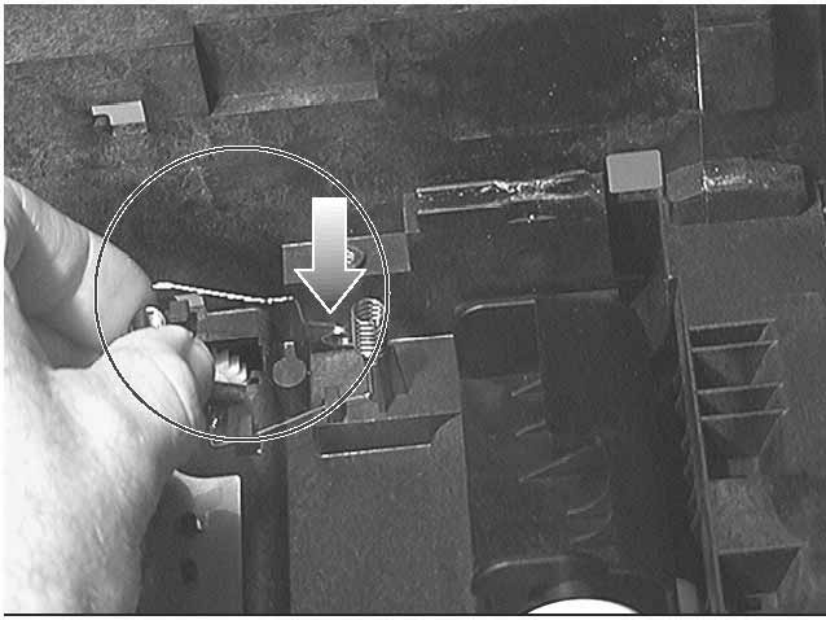
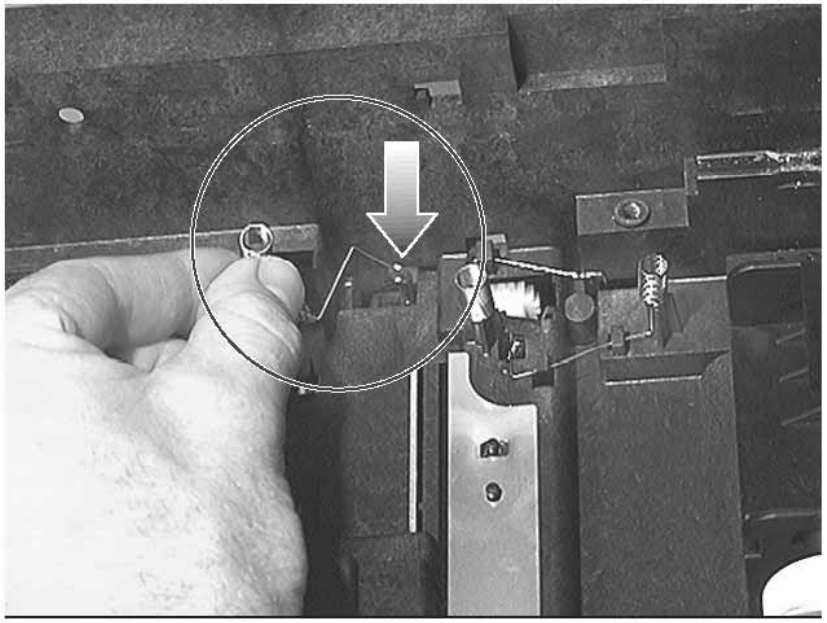


Figure 7-126Inserting the Spring through the Opening (2 of 2)

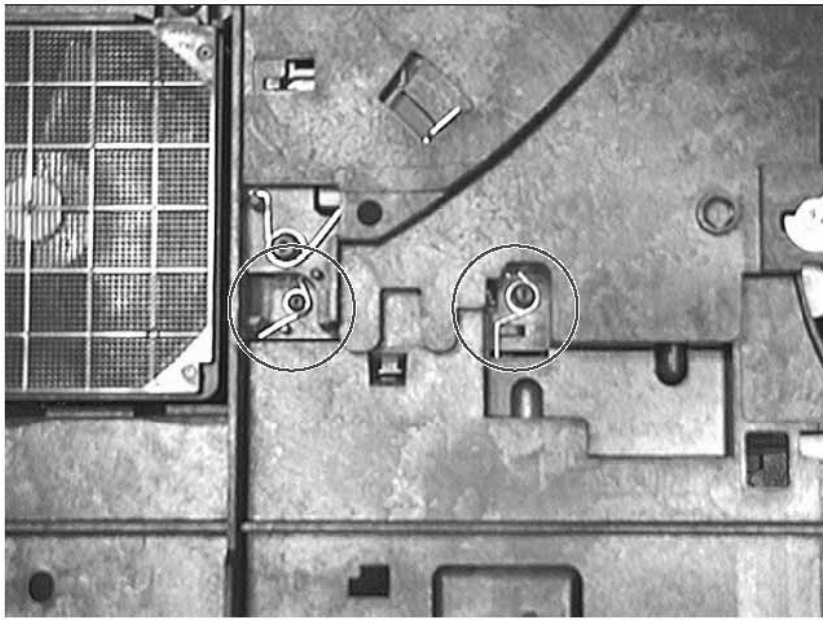


2 Place the spring coil over the retaining clip located on the side of printer (see figure 7-127).

3 Position the spring loop so that it rests in its slot.

4 Place the spring arm in the retaining clip located on the side of printer (see figure 7-127).

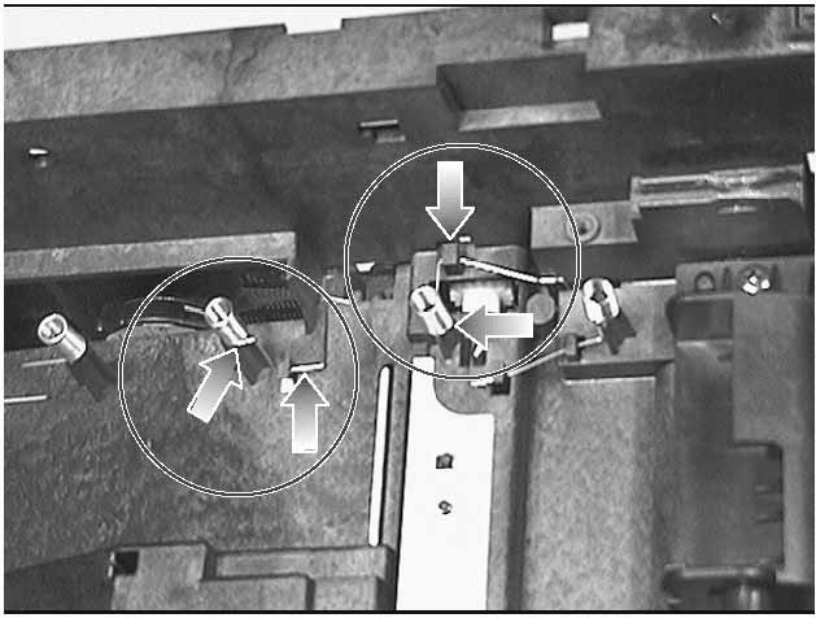
Figure 7-127Placing the Spring Coil and Arm over its Retaining Clip



5 Place the spring arm in the retaining clip located on the bottom of printer (see figure 7-128).

6 Place the spring coil over the retaining clip located on the bottom of printer (see figure 7-128).

Figure 7-128Placing the Spring Arm and Coil over its Retaining Clip



Tray 3 Cassette Assembly Removal

As shown in figure 7-129, lift the printer to remove Tray 3 (optional 250-sheet input tray).

Figure 7-129Removing Tray 3

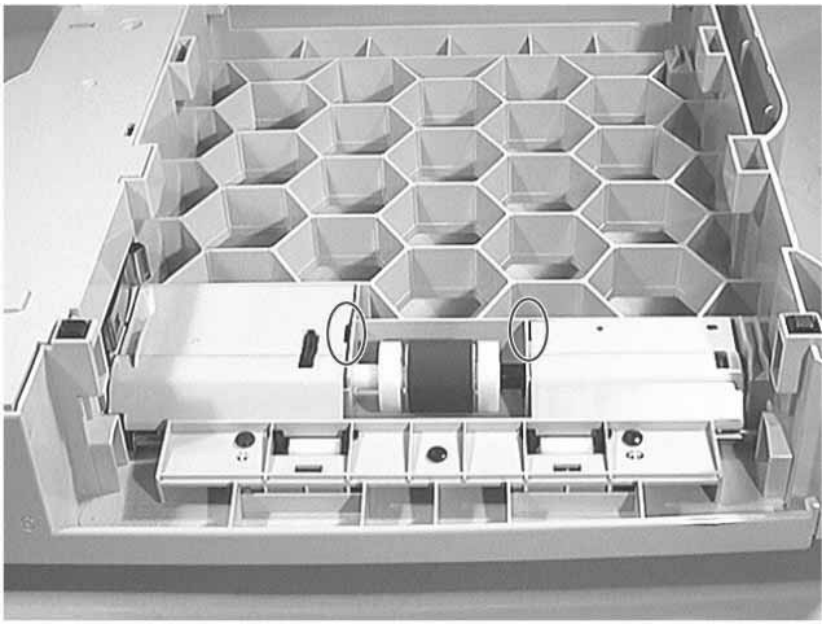
Tray 3 Pickup Roller Removal

1 Remove the following assemblies:

- Remove the Tray 3 Cassette Assembly. (See “Tray 3 Cassette Assembly Removal” (page 247) for instructions.)
- Place the Tray 3 paper cassette assembly top-down with the front of it facing outward (see figure 7-130).

2 To remove the two covers shown in figure 7-130 insert a flat-blade screwdriver in the latch openings.

Figure 7-130Removing the Two Covers



3 To complete this procedure perform step 5 through 10 in section “Tray 2 Pickup Roller Removal” (page 161).

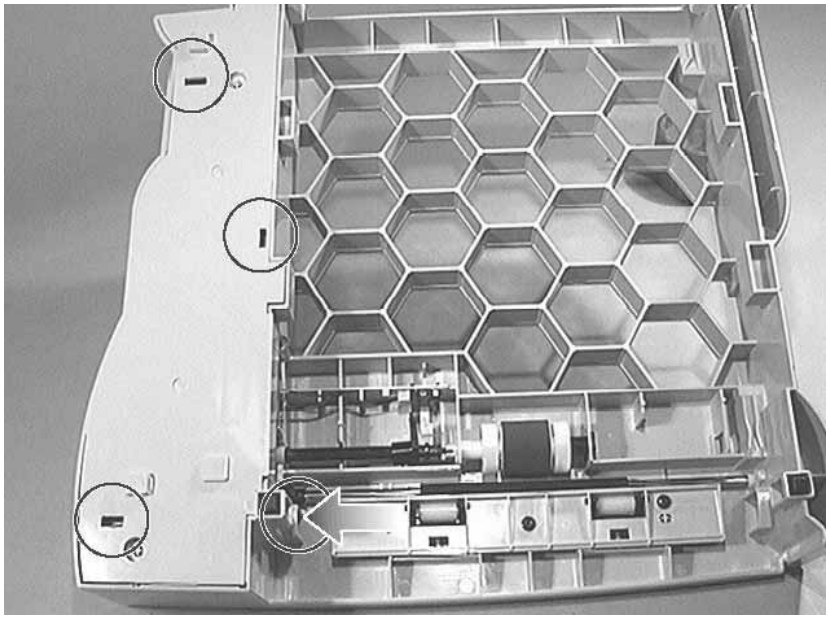
Tray 3 Paper Feeder Drive Assembly Removal

1 Remove the following assemblies:

- Remove the Tray 3 Cassette Assembly. (See “Tray 3 Cassette Assembly Removal” (page 247) for instructions.)
- Remove the Tray 3 pickup roller. (See “Tray 3 Pickup Roller Removal” (page 248) for instructions.)

2 To remove the cover shown in figure 7-131 insert a flat-blade screwdriver in the latch openings.

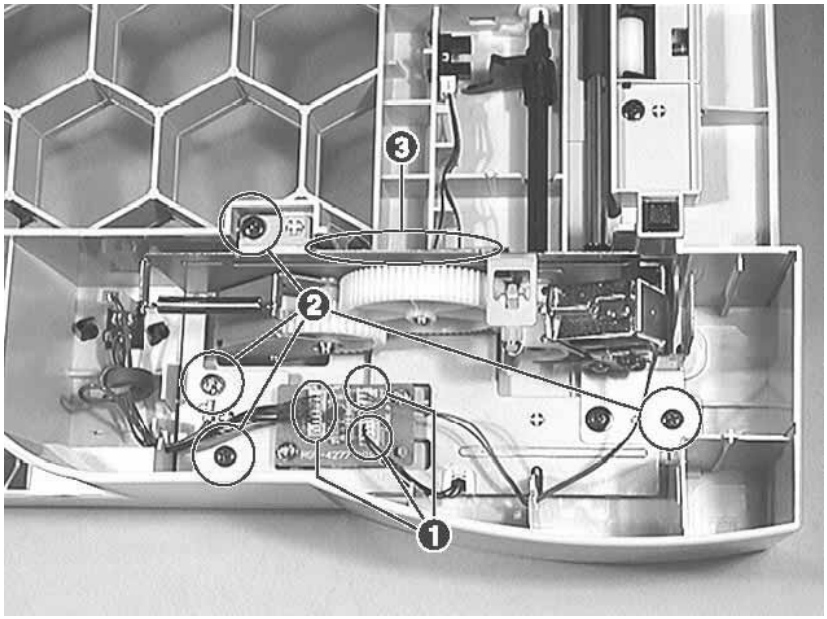
Figure 7-131Removing Gear Cover



3 Disconnect the three wire connectors shown in figure 7-132.

4 Remove the four screws shown in figure 7-132.

Figure 7-132Removing Tray 3 Wire Connectors and Screws



5 Press and hold the metal latch on the right-side of the assembly, and then lift to remove the Tray 3 paper feeder drive assembly.

Tray 3 Solenoid Removal

1 Remove the following assemblies:

- Remove the Tray 3 Cassette Assembly. (See “Tray 3 Cassette Assembly Removal” (page 247) for instructions.)
- Remove the Tray 3 pickup roller. (See “Tray 3 Pickup Roller Removal” (page 248) for instructions.)
- Remove the Tray 3 paper feeder drive assembly. (See “Tray 3 Paper Feeder Drive Assembly Removal” (page 249) for instructions.)

2 Remove the screw holding the solenoid to the drive assembly.

8 Parts and Diagrams

Overview

External Covers and Panels - - - - - - - - - - - - - - - - 254

Internal Components - 257

Printer Drive Assembly - - - - - - - - - - - - - - - - - - 265

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Numerical Parts List - - - - - - - - - - - - - - - - - - - 286

External Covers and Panels

Figure 8-1 Printer External Covers and Panels

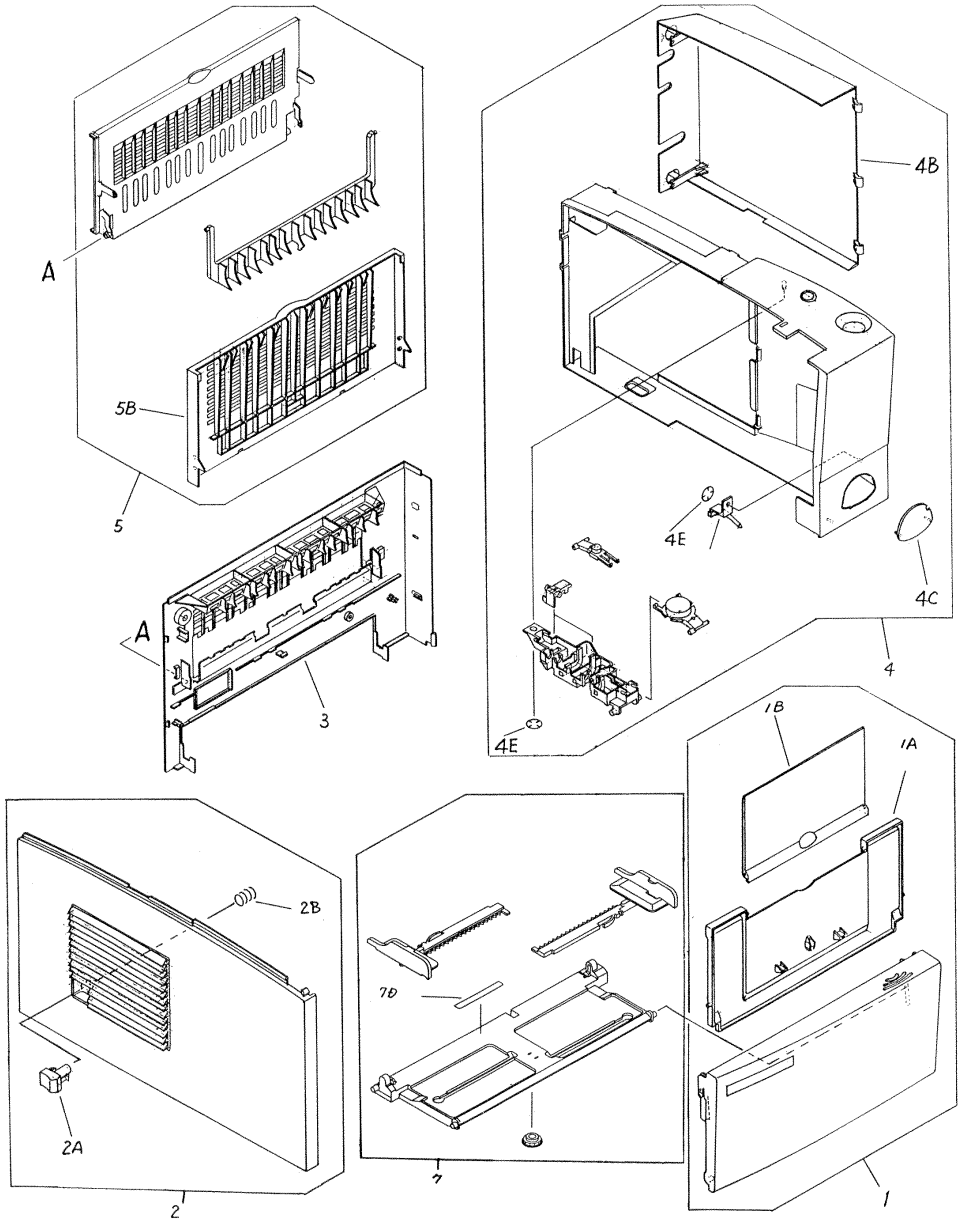


Table 8-1. Printer External Covers and Panels

Ref	Description	Part Number	Qty
	FORMATTER PCB	C4132-67901	
1	MP COVER ASSY	RG5-4121-000CN	1
1A	TRAY, EXPANSION 1	RB2-3036-000CN	1
1B	TRAY, EXPANSION 1	RB2-3037-000CN	1
2	LEFT COVER ASSY	RG5-4139-000CN	1
2A	BUTTON, POWERSWITCH	RB2-2859-000CN	1
2B	SPRING, COMPRESSION	RB2-2860-000CN	1
3	COVER, REAR	RB2-2857-000CN	1
4	DIMM COVER ASSY	RG5-4123-000CN	1
?	COVER, DIMM	RB2-2861-000CN	1
4B	COVER, I/O	RB2-2862-000CN	1
4C	IR WINDOW`	RB2-2866-000CN	1
4D	PIPE	RB2-2867-000CN	1
4F	LIGHT PIPE ASSY	RG5-4152-000CN	1
5	FACE-UP TRAY ASSY	RG5-4124-000CN	1
5B	TRAY, FACE-UP	RB2-2876-000CN	1
7	MP TRAY ASSY	RG5-4126-000CN	1
7D	SHEET, SEPARATION MP	RB2-2886-000CN	1
7D	PLATE, GROUNDING	RB2-2812-000CN	
ns	GUIDE, CABLE	RB2-2818-000CN	
ns	BLOCK, LIGHT PIPE	RB2-2863-000CN	
ns	GEAR, 18T	RB2-2885-000CN	
ns	GUIDE, DELIVERY, UPPER	RB2-2976-000CN	
ns	PLATE, GROUNDING	RB2-3051-000CN	
ns	COVER, GEAR	RB2-3072-000CN	
ns	GUIDE, DELIVERY, LOWER	RF5-2602-000CN	
ns	CABLE, FLAT	RH2-5348-000CN	
ns	GEAR, 23T/46T	RS6-0453-000CN	
ns	GEAR, 17T	RS6-0459-000CN	

Top Cover Assembly

Figure 8-2 Top Cover Assembly

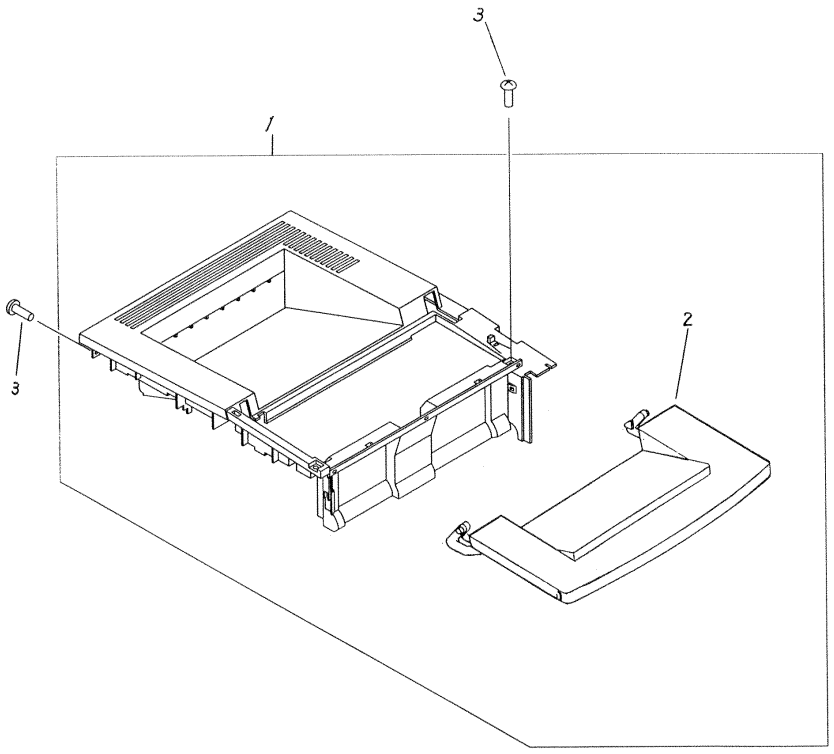


Table 8-2. Top Cover Assembly

Ref	Description	Part Number	Qty
1	TOP COVER ASSY	RG5-4122-000CN	1
2	COVER, CARTRIDGE	RB2-2856-000CN	1
3	SCREW, M4X10	XA9-0606-000CN	1

Internal Components

Figure 8-3 Internal Components (1 of 3)

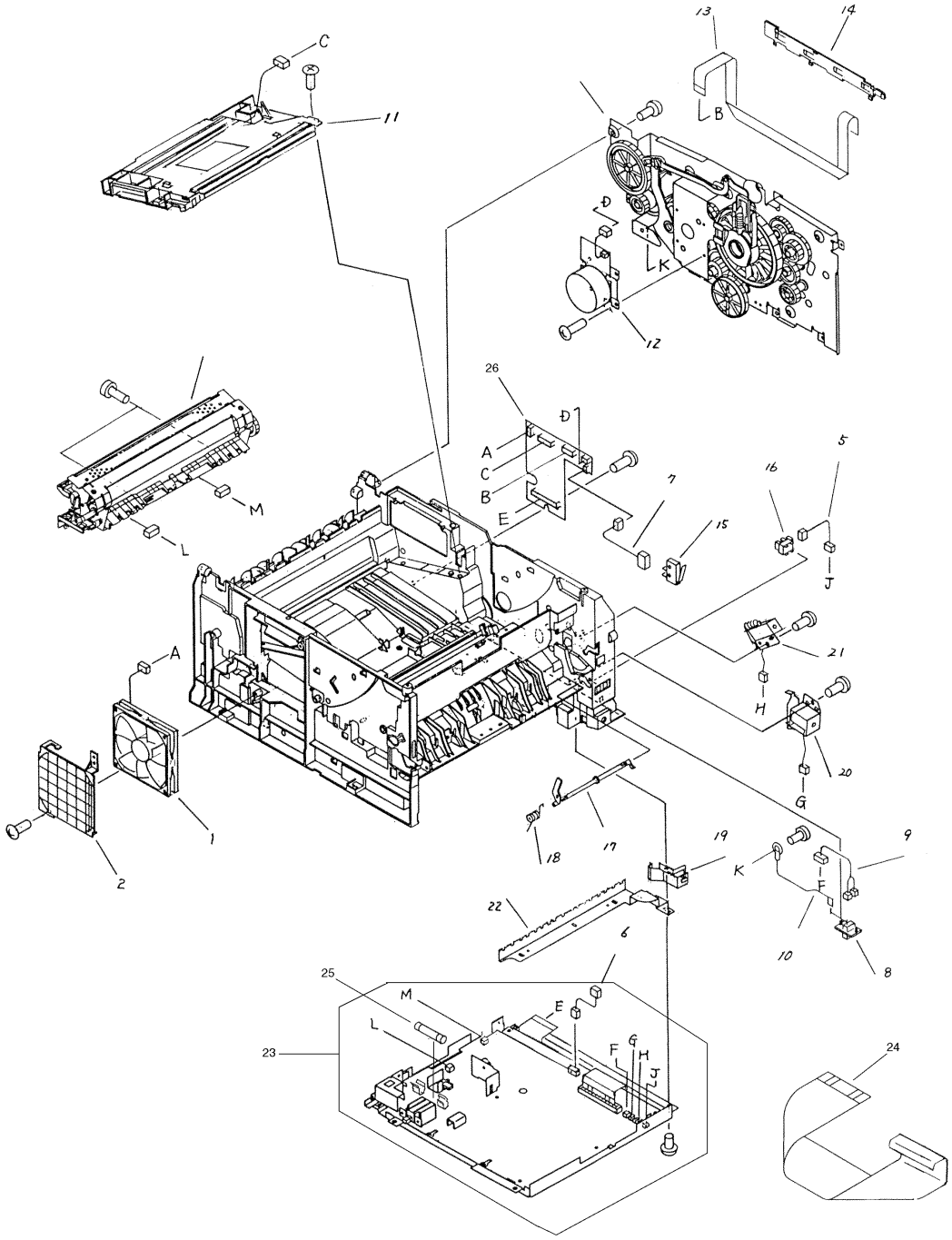


Table 8-3. Internal Components (1 of 3)

Ref	Description	Part Number	Qty
1	FAN	RH7-1382-000CN	1
2	FILTER, DUST	RB2-2817-000CN	1

Table 8-3. Internal Components (1 of 3) (continued)

Ref	Description	Part Number	Qty
5	MP SENSOR CABLE	RG5-4254-000CN	1
6	DC POWER CABLE	RG5-4255-000CN	1
7	INTERLOCK SWITCH CABLE	RG5-4256-000CN	1
8	CONNECTOR, 6P	VS1-6173-006	1
9	PAPER FEEDER CABLE	RG5-4262-000CN	1
10	FRAME GROUND CABLE	RG5-4263-000CN	1
11	LASER-SCANNER ASSY	RG5-4172-000CN	1
12	MAIN MOTOR ASSY	RH7-1380-000CN	1
13	CABLE, FLAT	RH2-5350-000CN	1
14	PLATE, GUIDE. FFC	RB2-2946-000CN	1
15	MICROSWITCH	RH7-6051-000CN	1
16	IC, TLP1242	WG8-5382-000CN	6
17	LEVER, SENSOR	RB2-2836-000CN	1
18	SPRING, TORSION	RB2-2837-000CN	1
19	SPRING, LEAF	RB2-2847-000CN	1
20	SOLENOID	RH7-5209-000CN	1
21	SOLENOID	RH7-5211-000CN	1
22	ELIMINATOR, STATIC CHARGE	RB2-2826-000CN	1
23	ENGINE CONTROLLER ASSY 100-127 V ENGINE CONTROLLER ASSY 220-240 V	RG5-4248 (4125) RG5-4249 (4150)	1
24	ECU CABLE	RH2-5348-000CN	1
25	FUSE 201	VD7-0211-002	1
26	INTERMEDIATE PCB ASSY	RG5-4250-000CN	1

Figure 8-4 **Internal Components (2 of 3)**

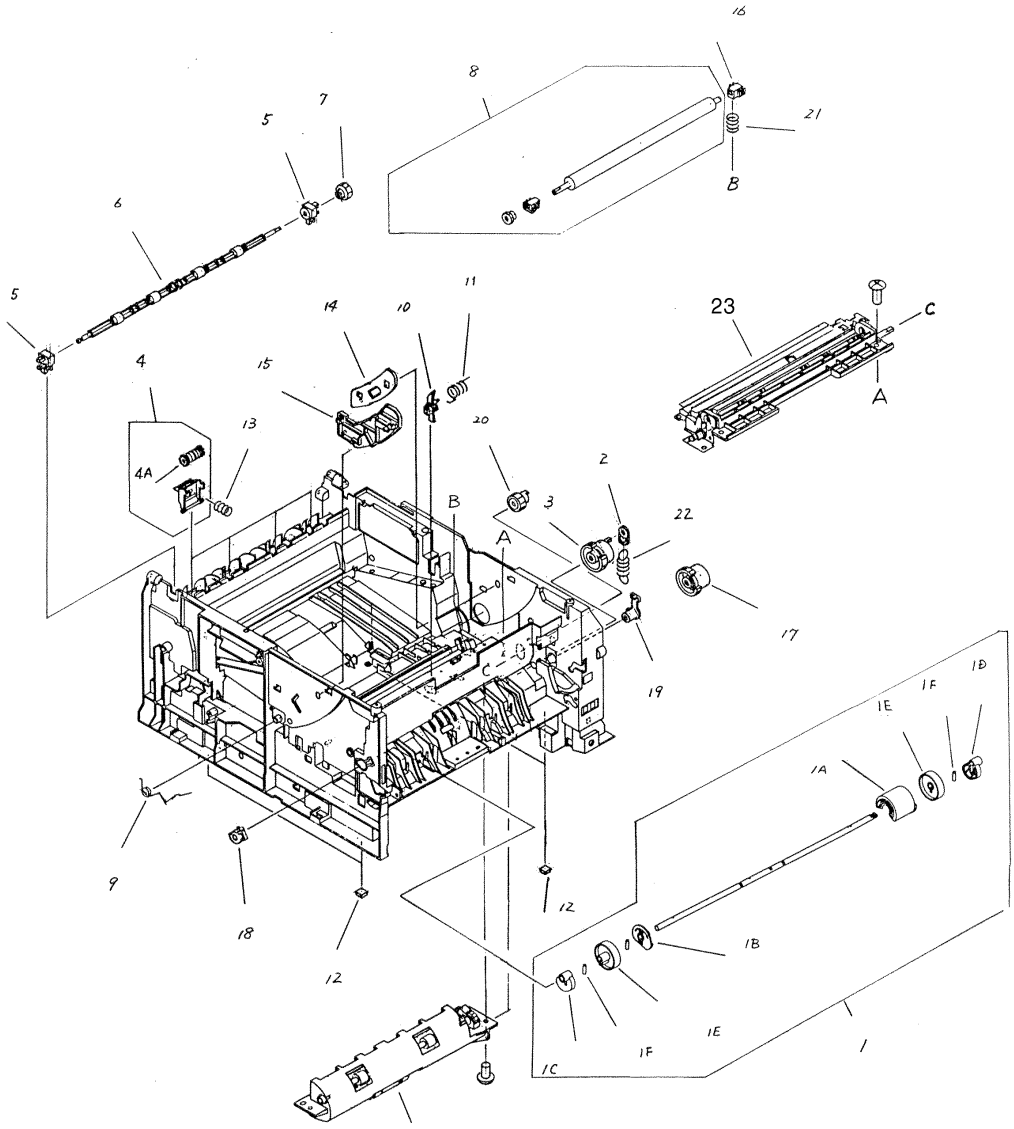


Table 8-4. Internal Components (2 of 3)

Ref	Description	Part Number	Qty
1	MP PICK-UP ASSY	RG5-4128-000CN	1
1A	ROLLER, PICK-UP	RB2-2900-000CN	1
1B	CAM, ROLLER	RB2-2901-000CN	1
1C	CAM, LFT	RB2-2902-000CN	1
1D	CAM, RT	RB2-2903-000CN	1
1E	ROLLER	RB2-2904-000CN	1
1F	PIN, DOWEL	XD9-0159-000CN	1
2	SPRING RETAINER	RB1-2190-000CN	1
3	GEAR, 26T	RS6-0444-000CN	1
4	FU DELIVERY ROLLER ASSY	RG5-4119-000CN	1
4A	ROLLER, FACE-DOWN LWR	RB2-2849-000CN	1
5	BUSHING	RB2-2850-000CN	1
6	ROLLER, FACE-DOWN, UPPR	RF5-2604-000CN	1
7	GEAR, 15T	RS6-0441-000CN	1
8	TRANSFER ROLLER ASSY	RG5-4130-000CN	1
8B	BUSHING, TRANSFER, LFT	RB2-2925-000CN	1
9	SPRING, COMPRESSION	RB2-2832-000CN	1
10	ARM, SENSOR	RB2-2842-000CN	1
11	SPRING, TORSION	RB2-2843-000CN	1
12	FOOT	RB2-2816-000CN	1
13	SPRING, COMPRESSION	RS6-2023-000CN	1
14	GUIDE, CARTRIDGE, RT	RB2-2830-000CN	1
15	GUIDE, CARTRIDGE, LFT	RB2-2831-000CN	1
16	BUSHING, TRANSFER, RT	RB2-2926-000CN	1
17	GEAR, 26T	RB2-3040-000CN	1
18	BUSHING, LFT	RB2-3043-000CN	1
19	BUSHING, RT	RB2-3044-000CN	1
20	GEAR, 14T	RS6-0445-000CN	1
21	SPRING, COMPRESSION	RS6-2022-000CN	1
22	SPRING, TENSION	RS6-2025-000CN	1
23	REGISTRATION ASSY	RG5-4129-000CN	1

Figure 8-5 Internal Components (3 of 3)

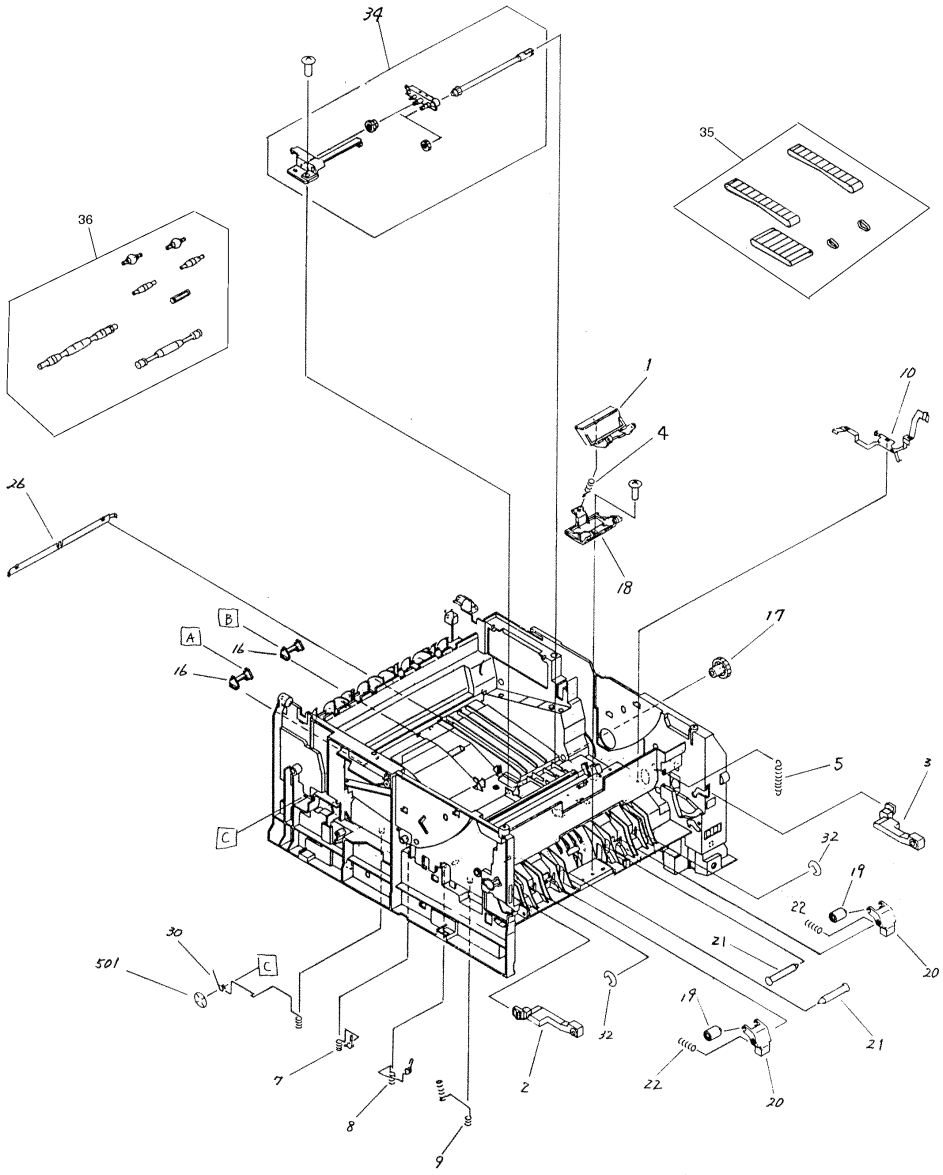


Table 8-5. Internal Components (3 of 3)

Ref	Description	Part Number	Qty
1	PAD, SEPARATION	RB2-2835-000CN	1
2	HINGE, LFT	RB2-3041-000CN	1
3	HINGE, RT	RB2-3042-000CN	1
4	SPRING, COMPRESSION	RS6-2024-000CN	1
5	SPRING, TENSION	RS6-2030-000CN	1
7	SPRING, COMPRESSION	RB2-2828-000CN	1
8	SPRING, COMPRESSION	RB2-2829-000CN	1
9	SPRING, COMPRESSION	RB2-2845-000CN	1

Table 8-5. Internal Components (3 of 3) (continued)

Ref	Description	Part Number	Qty
10	SPRING, LEAF, GROUNDING	RB2-3045-000CN	1
16	SHAFT, IDLER	RB2-3074-000CN	1
17	GEAR, 20T	RS6-0464-000CN	1
18	HOLDER, SEPARATION PAD	RB2-2838-000CN	1
19	ROLLER	RB2-3046-000CN	1
20	HOLDER, ROLLER	RB2-3047-000CN	1
21	SHAFT	RB2-3048-000CN	1
22	SPRING, COMPRESSION	RS6-2033-000CN	1
26	PLATE, GROUNDING	RB2-3080-000CN	1
30	SPRING, TORSION	RB2-3050-000CN	1
32	RING, E	XD9-0134-000CN	1
34	GEAR ASSY	RG5-4160-000CN	1
35	TRANSPORT BELT KIT	RY7-5053-000CN	1
36	TRANSPORT ROLLER KIT	RY7-5052-000CN	1

Fuser

Figure 8-6 Fuser

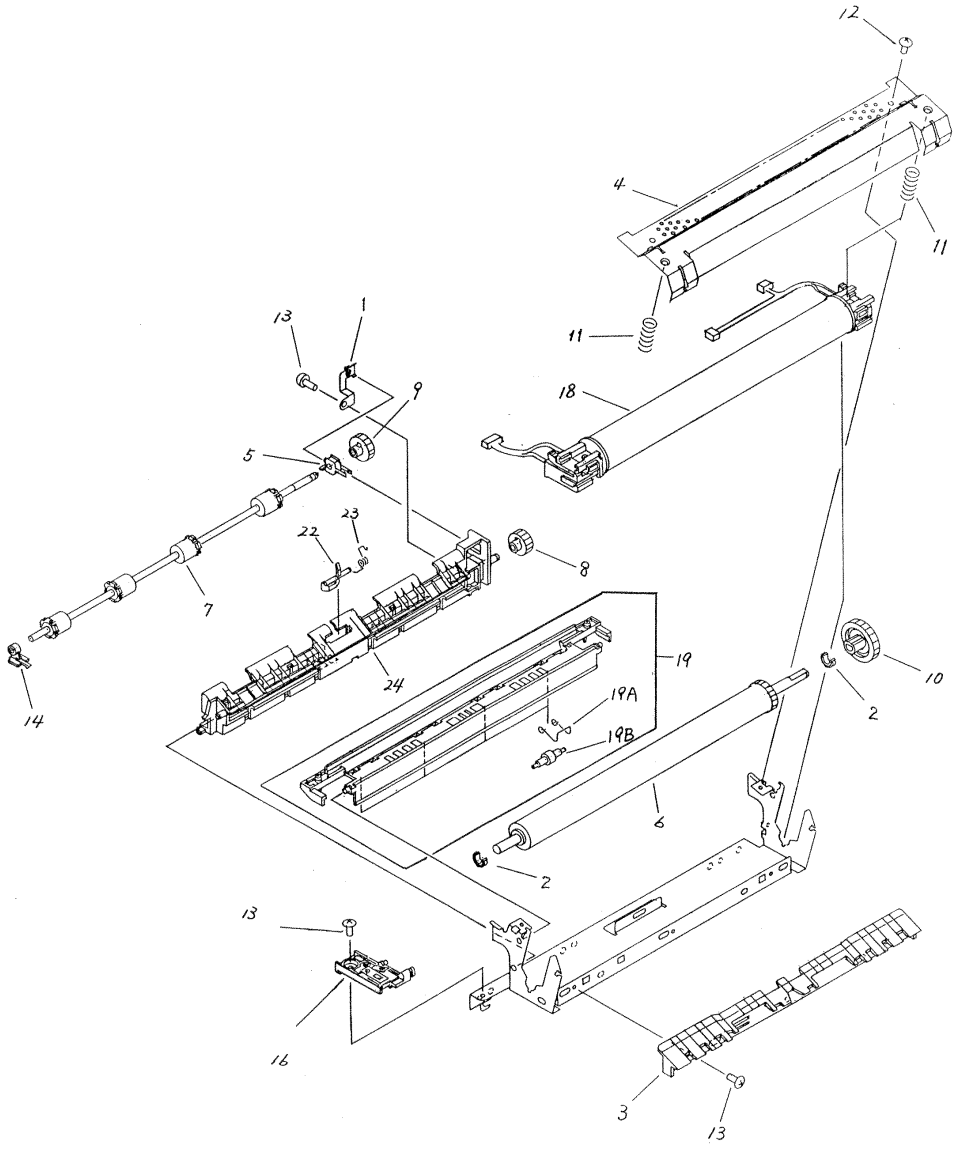


Table 8-6. Fuser

Ref	Description	Part Number	Qty
	FIXING/FUSING ASSY 110V	RG5-4132-000CN	1
	FIXING/FUSING ASSY 220V	RG5-4133-000CN	1
1	PLATE, GROUNDING	RB2-2990-000CN	1
2	BUSHING	RB2-2973-000CN	2
3	GUIDE, ENTRANCE	RB2-2974-000CN	1
4	PLATE, PRESSURE	RB2-2975-000CN	1
5	BUSHING	RB2-2985-000CN	1
6	ROLLER, PRESSURE	RF5-2601-000CN	1
7	ROLLER, DELIVERY	RF5-2603-000CN	1
8	GEAR, 14T	RS6-0442-000CN	1
9	GEAR, 15T	RS6-0443-000CN	1
10	GEAR, 26T	RS6-0458-000CN	1
11	SPRING, COMPRESSION	RS6-2029-000CN	2
14	BUSHING	RB2-2986-000CN	1
16	HOLDER, CONTACT	RF5-2609-000CN	1
18	FUSING FILM ASSY 110V	RG5-4134-000CN	1
18	FUSING FILM ASSY 220V	RG5-4135-000CN	1
19	UPPER DELIVERY GUIDE	RG5-4141-000CN	1
19A	SPRING, COMPRESSION	RB2-2978-000CN	1
19B	ROLLER, DELIVERY	RB2-2977-000CN	1
22	LEVER, SENSOR	RB2-2981-000CN	1
23	SPRING, TORSION	RB2-2982-000CN	1
24	EXIT ROLLER SUPPORT	RB2-2979-000CN	1

Printer Drive Assembly

Figure 8-7 Printer Drive Assembly

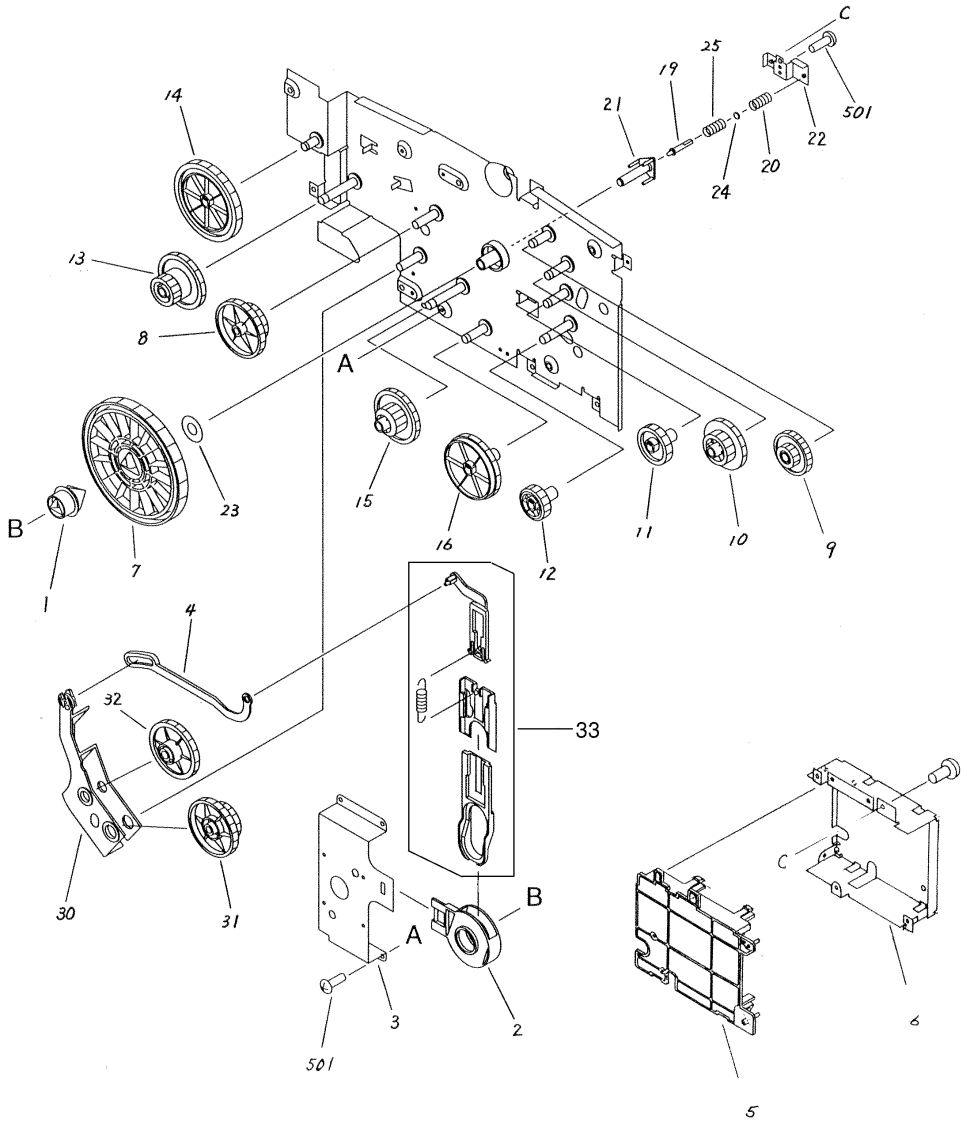


Table 8-7. Printer Drive Assembly

Ref	Description	Part Number	Qty
	PRINTER DRIVE ASSY	RG5-4131-000CN	1
1	SHAFT, COUPLING	RB2-2935-000CN	1
2	BUSHING	RB2-2936-000CN	1
3	PLATE, MOTOR	RB2-2937-000CN	1
4	LEVER, DRIVE RELEASE	RB2-2939-000CN	1
5	RAIL, GUIDE	RB2-2944-000CN	1
6	PLATE, MOUNT	RB2-2945-000CN	1
7	GEAR, 201T	RS6-0446-000CN	1

Table 8-7. Printer Drive Assembly (continued)

Ref	Description	Part Number	Qty
8	GEAR, 58T/92T	RS6-0447-000CN	1
9	GEAR, 17T/68T	RS6-0448-000CN	1
10	GEAR, 25T/41T	RS6-0449-000CN	1
11	GEAR, 31T	RS6-0450-000CN	1
12	GEAR, 26T	RS6-0451-000CN	1
14	GEAR, 67T	RS6-0455-000CN	1
13	GEAR, 23T/46T	RS6-0453-000CN	1
15	GEAR, 22T/86T	RS6-0456-000CN	1
16	GEAR, 53T	RS6-0457-000CN	1
19	PIN	RB2-2943-000CN	1
20	SPRING, COMPRESSION	RS6-2027-000CN	1
21	HOLDER, PIN	RB2-2947-000CN	1
22	PLATE, SPRING	RB2-2948-000CN	1
23	WASHER	RB2-2949-000CN	1
24	FLANGE, SPRING	RB2-2950-000CN	1
25	SPRING, COMPRESSION	RS6-2031-000CN	1
2X	COUPLING ASSEMBLY	RG5-4140-000CN	1
26	LEVER, COUPLING	RB2-2940-000CN	1
27	CAM, COUPLING	RB2-2941-000CN	1
28	SPACER, COUPLING	RB2-2942-000CN	1
29	SPRING, TENSION	RS6-2028-000CN	1
30	ARM, DRIVE	RB2-2938-000CN	1
31	GEAR, 22T/93T	RS6-0452-000CN	1
32	GEAR, 48T	RS6-0454-000CN	1
33	COUPLING ASSY	R6504140-000CN	1

Paper Feeder Drive Assembly

Figure 8-8 Paper Feeder Drive Assembly

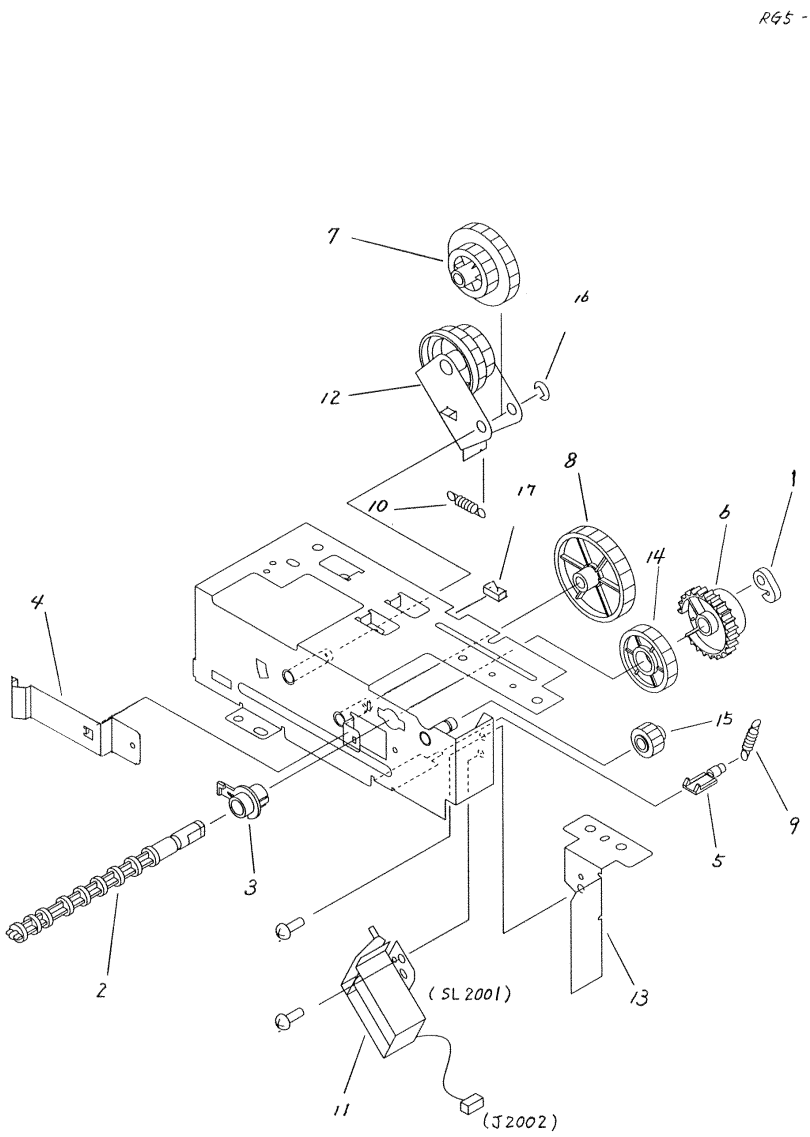


Table 8-8. Paper Feeder Drive Assembly

Ref	Description	Part Number	Qty
	PAPER FEED DRIVE ASSY	RG5-4391-000CN	1
1	COLLAR, SPRING	RB1-2190-000CN	1
2	SHAFT, DRIVE	RB2-2893-000CN	1
3	BUSHING	RB2-3475-000CN	1
4	SPRING, LEAF	RB2-3478-000CN	1
5	CAP, SPRING	RB1-6133-000CN	1
6	GEAR, 27T	RS6-0495-000CN	1
7	GEAR, 39T/34T	RS6-0497-000CN	1
8	GEAR, 45T	RS6-0498-000CN	1
9	SPRING, TENSION	RS6-2061-000CN	1
10	SPRING, TENSION	RS6-2062-000CN	1
11	SOLENOID	RH7-5213-000CN	1
12	SWING GEAR ASSY	RF5-2755-000CN	1
13	PLATE	RB2-3481-000CN	1
14	GEAR, 39T	RS6-0499-000CN	1
15	GEAR, 17T	RS6-0500-000CN	1
16	RETAINING CLIP	XD9-0136-000CN	1
17	NEED A NAME FOR THIS SWITCH	WT2-5300-000CN	1

Paper Tray

Figure 8-9 Paper Tray

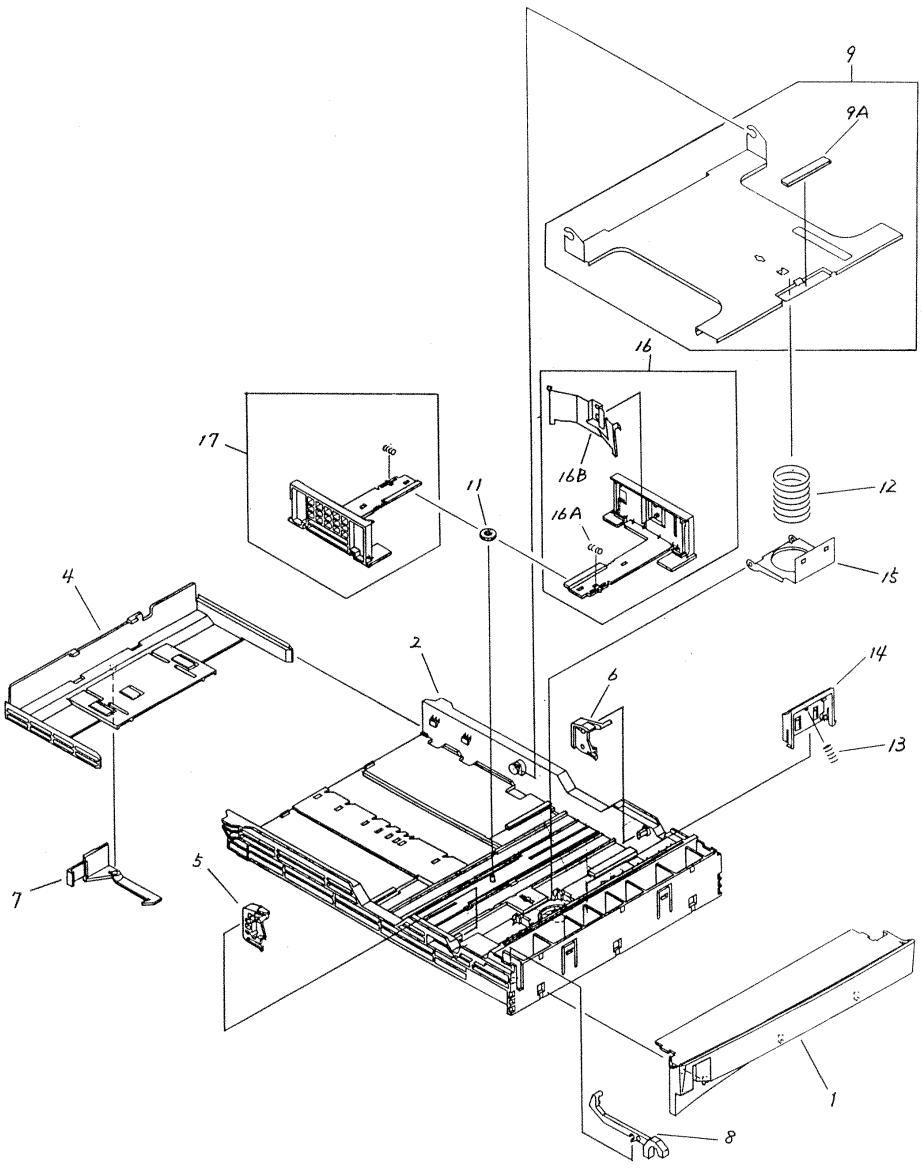


Table 8-9. Paper Tray

Ref	Description	Part Number	Qty
	PAPER CASSETTE ASSY	RG5-4138-000CN	1
1	COVER, FRONT	RB2-3000-000CN	1
2	BODY, CASSETTE	RB2-3001-000CN	1
4	PLATE, END	RB2-3003-000CN	1
5	ARM, RELEASE, LFT	RB2-3004-000CN	1
6	ARM, RELEASE, RT	RB2-3005-000CN	1
7	ARM, LOCK	RB2-3009-000CN	1
8	ARM, SENSOR	RB2-3010-000CN	1
9	PLATE, UPPER LIFTING	RF5-2599-000CN	1
9A	SHEET, SEPARATION	RB2-3007-000CN	1
11	GEAR, 10T	RS6-0440-000CN	1
12	SPRING, COMPRESSION	RS6-2020-000CN	1
13	SPRING, COMPRESSION	RS6-2021-000CN	1
14	PAD, SEPARATION	RB2-3008-000CN	1
15	HOLDER, SEPARATION PAD	RB2-3013-000CN	1
16	RT SIDE PLATE ASSY	RG5-4158-000CN	1
16A	SPRING, COMPRESSION	RS6-2035-000CN	2
16B	SPRING, LEAF	RB2-3012-000CN	1
17	LFT SIDE PLATE ASSY	RG5-4159-000CN	1

Paper Tray Pickup Assembly

Figure 8-10 Paper Tray Pickup Assembly

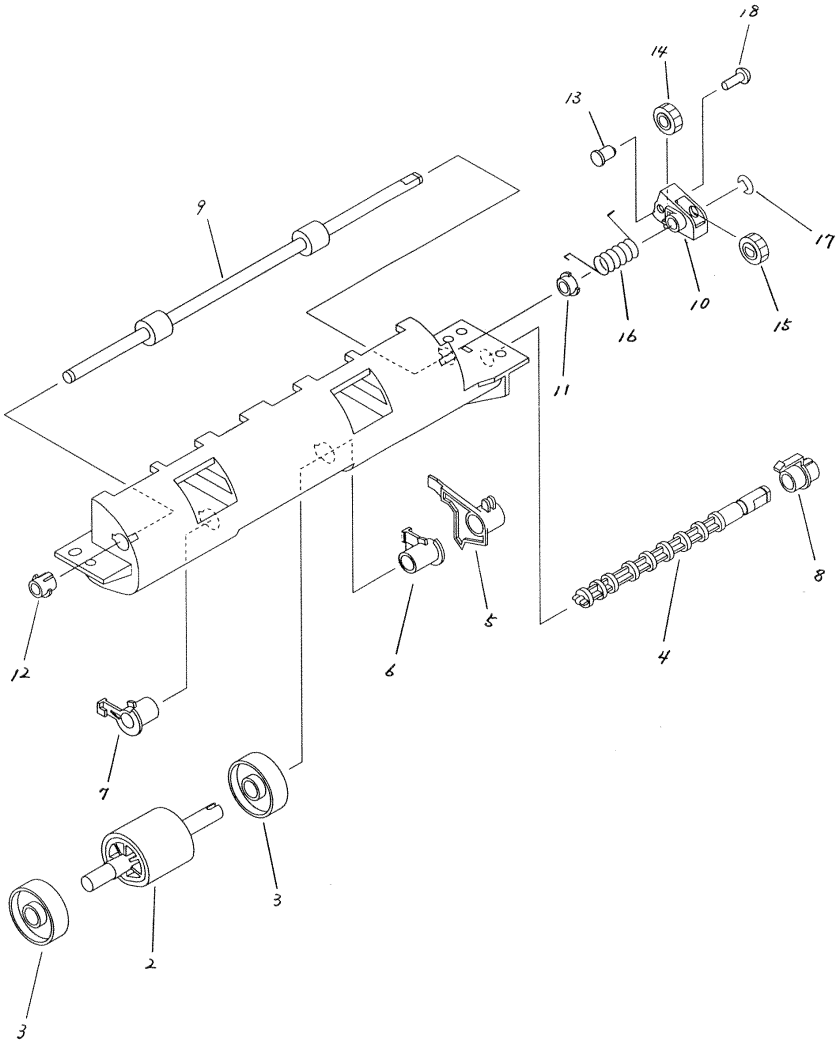


Table 8-10. Paper Tray Pickup Assembly

Ref	Description	Part Number	Qty
	PAPER PICK-UP ASSY	RG5-4127-000CN	1
2	ROLLER, PICK-UP	RB2-2891-000CN	1
3	ROLLER	RB2-2892-000CN	2
4	SHAFT, DRIVE	RB2-2893-000CN	1
5	LEVER, PAPER SENSOR	RB2-2894-000CN	1
6	BUSHING, RT	RB2-2895-000CN	1
7	BUSING, LFT	RB2-2896-000CN	1
8	BUSHING	RB2-2897-000CN	1
9	ROLLER	RB2-2898-000CN	1
10	HOLDER, GEAR	RB2-2899-000CN	1
11	BUSHING	RB2-3081-000CN	1
12	BUSHING	RB2-3082-000CN	1
13	SHAFT	RB2-3083-000CN	1
14	GEAR, 14T	RS6-0462-000CN	1
15	GEAR, 13T	RS6-0463-000CN	1
16	SPRING, TORSION	RS6-2034-000CN	1
17	RING, E	XD9-0135-000CN	1

Paper Tray External Covers

Figure 8-11 Paper Tray External Covers

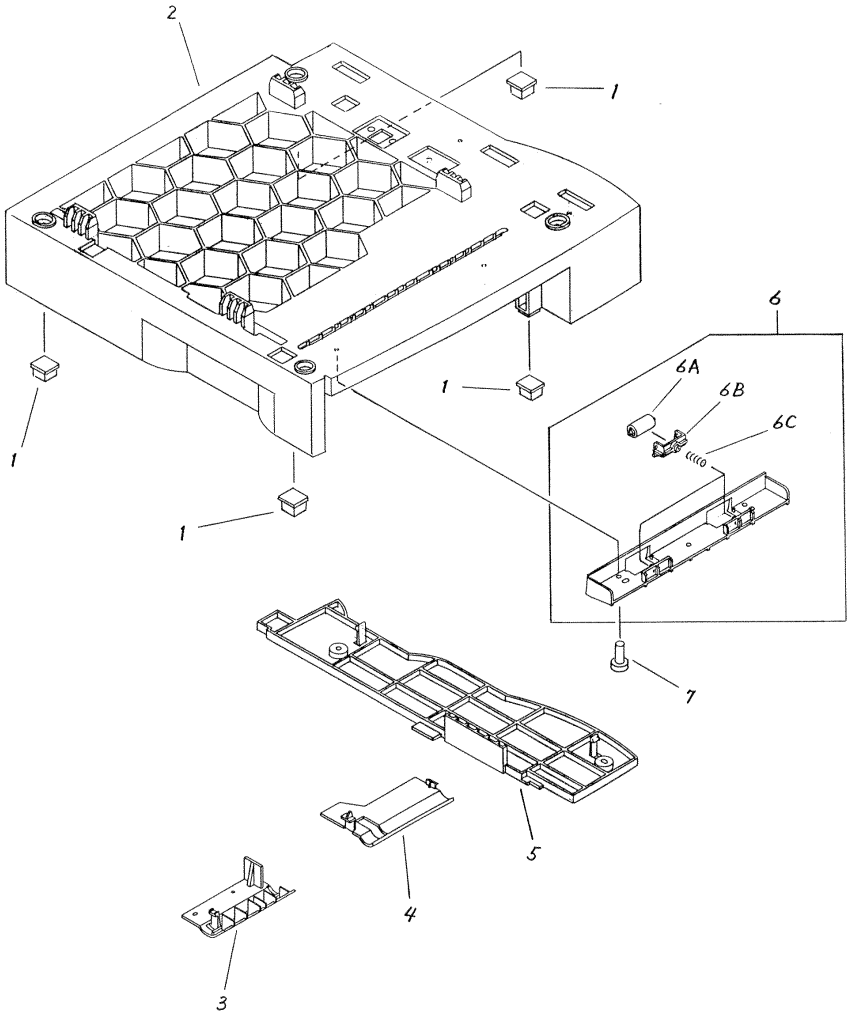


Table 8-11. Paper Tray External Covers

Ref	Description	Part Number	Qty
1	FOOT	RB2-2816-000CN	4
2	FRAME, FEEDER	RB2-3471-000CN	1
3	COVER, 3	RB2-3489-000CN	1
4	COVER, 1	RB2-3479-000CN	1
5	COVER, 2	RB2-3480-000CN	1
6	LOWER FEED ROLLER ASSY	RG5-4394-000CN	1
6A	ROLLER	RB2-3484-000CN	1
6B	HOLDER, ROLLER	RB2-3485-000CN	1
6C	SPRING, COMPRESSION	RS6-2063-000CN	1
7	SCREW, M4X8	XA9-0605-000CN	3

Paper Tray Internal Components

Figure 8-12 Paper Tray Internal Components

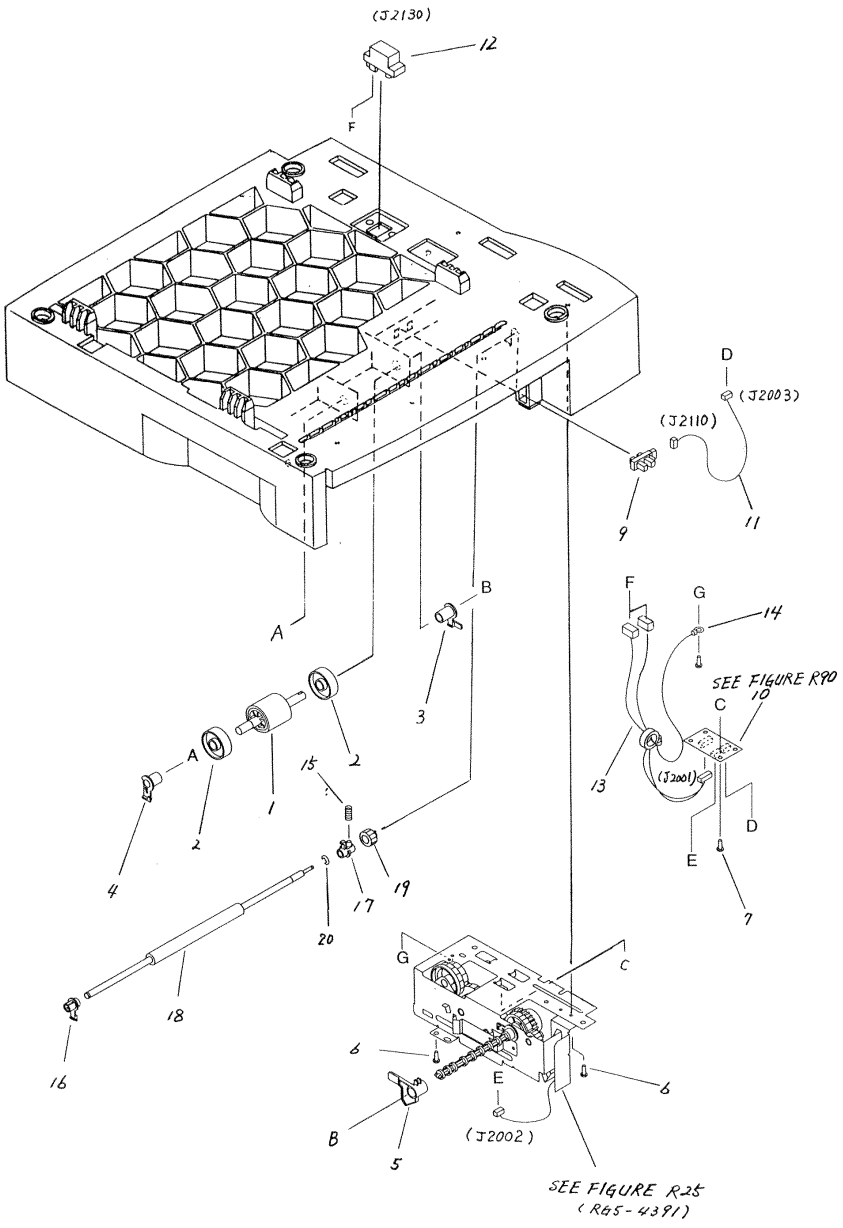


Table 8-12. Paper Tray Internal Components

Ref	Description	Part Number	Qty
1	ROLLER, PICK-UP	RB2-2891-000CN	1
2	ROLLER	RB2-2892-000CN	1
3	BUSHING, RT	RB2-2895-000CN	1
4	BUSHING, LFT	RB2-2896-000CN	1
5	LEVER, SENSOR	RB2-3474-000CN	1
7	SCREW, W/WASHER M3X8	XA9-0924-000CN	1
9	IC, TLP1242	WG8-5382-000CN	1
10	PAPER FEED DRIVE PCB ASSY	RG5-4277-000CN	1
11	SENSOR CABLE	RG5-4278-000CN	1
12	CONNECTOR	VS1-6174-006	1
13	RELAY CABLE	RG5-4280-000CN	1
14	FG CABLE	RG5-4281-000CN	1
15	SPRING, COMPRESSION	RS6-2064-000CN	1
16	BUSHING	RB2-3486-000CN	1
17	BUSHING	RB2-3487-000CN	1
18	ROLLER, FEED	RB2-3490-000CN	1
19	GEAR, 15T	RS6-0501-000CN	1
501	SCREW, MACHINE M4X8	XB6-7400-809	1

Hardware Table

Table 8-13. Hardware Table

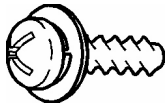
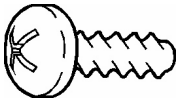
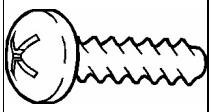
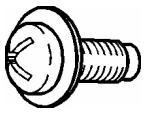
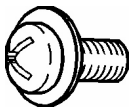
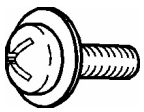
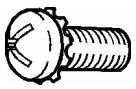
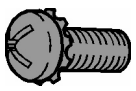
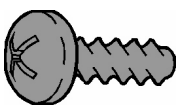
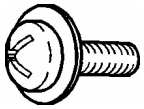
Example	Description	Part Number
	?????	
	Screw, M4X10	XA9-0606
	?????	
	Screw, M3X6	XA9-0836
	Screw, tapping, pan head, M3X4	XB-7300-407
	Screw, M3X8	XB2-7300-607
	Screw, M3X8	XB2-7300-807 or XA9-0924?
	Screw, M3X8	XB2-7300-807 or XA9-0924?
	Screw, M4x12	XA9-0773

Table 8-13. Hardware Table (continued)

Example	Description	Part Number
	Screw, M4x12 (brass colored pan head)	?????

Alphabetical Parts List

Table 8-14. Alphabetical Parts List

Description	Part Number	Table and Page
ARM, DRIVE	RB2-2938-000CN	table 8-7 on page 265
ARM, LOCK	RB2-3009-000CN	table 8-9 on page 270
ARM, RELEASE, LFT	RB2-3004-000CN	table 8-9 on page 270
ARM, RELEASE, RT	RB2-3005-000CN	table 8-9 on page 270
ARM, SENSOR	RB2-2842-000CN	table 8-4 on page 260
ARM, SENSOR	RB2-3010-000CN	table 8-9 on page 270
BLOCK, LIGHT PIPE	RB2-2863-000CN	table 8-1 on page 255
BODY, CASSETTE	RB2-3001-000CN	table 8-9 on page 270
BUSHING	RB2-2850-000CN	table 8-4 on page 260
BUSHING	RB2-2897-000CN	table 8-10 on page 272
BUSHING	RB2-2936-000CN	table 8-7 on page 265
BUSHING	RB2-2973-000CN	table 8-6 on page 264
BUSHING	RB2-2985-000CN	table 8-6 on page 264
BUSHING	RB2-2986-000CN	table 8-6 on page 264
BUSHING	RB2-3081-000CN	table 8-10 on page 272
BUSHING	RB2-3082-000CN	table 8-10 on page 272
BUSHING	RB2-3475-000CN	table 8-8 on page 268
BUSHING	RB2-3486-000CN	table 8-12 on page 276
BUSHING	RB2-3487-000CN	table 8-12 on page 276
BUSHING, LFT	RB2-2896-000CN	table 8-12 on page 276
BUSHING, LFT	RB2-3043-000CN	table 8-4 on page 260
BUSHING, RT	RB2-2895-000CN	table 8-10 on page 272
BUSHING, RT	RB2-2895-000CN	table 8-12 on page 276
BUSHING, RT	RB2-3044-000CN	table 8-4 on page 260
BUSHING, TRANSFER, LFT	RB2-2925-000CN	table 8-4 on page 260
BUSHING, TRANSFER, RT	RB2-2926-000CN	table 8-4 on page 260
BUSING, LFT	RB2-2896-000CN	table 8-10 on page 272
BUTTON, POWERSWITCH	RB2-2859-000CN	table 8-1 on page 255
CABLE, FLAT	RH2-5348-000CN	table 8-1 on page 255
CABLE, FLAT	RH2-5350-000CN	table 8-3 on page 257
CAM, COUPLING	RB2-2941-000CN	table 8-7 on page 265
CAM, LFT	RB2-2902-000CN	table 8-4 on page 260
CAM, ROLLER	RB2-2901-000CN	table 8-4 on page 260
CAM, RT	RB2-2903-000CN	table 8-4 on page 260
CAP, SPRING	RB1-6133-000CN	table 8-8 on page 268

Table 8-14. Alphabetical Parts List (continued)

Description	Part Number	Table and Page
COLLAR, SPRING	RB1-2190-000CN	table 8-8 on page 268
CONNECTOR	VS1-6174-006	table 8-12 on page 276
CONNECTOR, 6P	VS1-6173-006	table 8-3 on page 257
COUPLING ASSEMBLY	RG5-4140-000CN	table 8-7 on page 265
COUPLING ASSY	R6504140-000CN	table 8-7 on page 265
COVER, 1	RB2-3479-000CN	table 8-11 on page 274
COVER, 2	RB2-3480-000CN	table 8-11 on page 274
COVER, 3	RB2-3489-000CN	table 8-11 on page 274
COVER, CARTRIDGE	RB2-2856-000CN	table 8-2 on page 256
COVER, DIMM	RB2-2861-000CN	table 8-1 on page 255
COVER, FRONT	RB2-3000-000CN	table 8-9 on page 270
COVER, GEAR	RB2-3072-000CN	table 8-1 on page 255
COVER, I/O	RB2-2862-000CN	table 8-1 on page 255
COVER, REAR	RB2-2857-000CN	table 8-1 on page 255
DC POWER CABLE	RG5-4255-000CN	table 8-3 on page 257
DIMM COVER ASSY	RG5-4123-000CN	table 8-1 on page 255
ECU CABLE	RH2-5348-000CN	table 8-3 on page 257
ELIMINATOR, STATIC CHARGE	RB2-2826-000CN	table 8-3 on page 257
ENGINE CONTROLLER ASSY 100-127 V ENGINE CONTROLLER ASSY 220-240 V	RG5-4248 (4125) RG5-4249 (4150)	table 8-3 on page 257
EXIT ROLLER SUPPORT	RB2-2979-000CN	table 8-6 on page 264
FACE-UP TRAY ASSY	RG5-4124-000CN	table 8-1 on page 255
FAN	RH7-1382-000CN	table 8-3 on page 257
FG CABLE	RG5-4281-000CN	table 8-12 on page 276
FILTER, DUST	RB2-2817-000CN	table 8-3 on page 257
FUSING FILM ASSY 110V	RG5-4134-000CN	table 8-6 on page 264
FUSING FILM ASSY 220V	RG5-4135-000CN	table 8-6 on page 264
FIXING/FUSING ASSY 110V	RG5-4132-000CN	table 8-6 on page 264
FIXING/FUSING ASSY 220V	RG5-4133-000CN	table 8-6 on page 264
FLANGE, SPRING	RB2-2950-000CN	table 8-7 on page 265
FOOT	RB2-2816-000CN	table 8-4 on page 260
FOOT	RB2-2816-000CN	table 8-11 on page 274
FORMATTER PCB	C4132-67901	table 8-1 on page 255
FRAME GROUND CABLE	RG5-4263-000CN	table 8-3 on page 257
FRAME, FEEDER	RB2-3471-000CN	table 8-11 on page 274
FU DELIVERY ROLLER ASSY	RG5-4119-000CN	table 8-4 on page 260
FUSE 201	VD7-0211-002	table 8-3 on page 257
GEAR ASSY	RG5-4160-000CN	table 8-5 on page 261

Table 8-14. Alphabetical Parts List (continued)

Description	Part Number	Table and Page
GEAR, 10T	RS6-0440-000CN	table 8-9 on page 270
GEAR, 13T	RS6-0463-000CN	table 8-10 on page 272
GEAR, 14T	RS6-0442-000CN	table 8-6 on page 264
GEAR, 14T	RS6-0445-000CN	table 8-4 on page 260
GEAR, 14T	RS6-0462-000CN	table 8-10 on page 272
GEAR, 15T	RS6-0441-000CN	table 8-4 on page 260
GEAR, 15T	RS6-0443-000CN	table 8-6 on page 264
GEAR, 15T	RS6-0501-000CN	table 8-12 on page 276
GEAR, 17T	RS6-0500-000CN	table 8-8 on page 268
GEAR, 17T/68T	RS6-0448-000CN	table 8-7 on page 265
GEAR, 18T	RB2-2885-000CN	table 8-1 on page 255
GEAR, 201T	RS6-0446-000CN	table 8-7 on page 265
GEAR, 20T	RS6-0464-000CN	table 8-5 on page 261
GEAR, 22T/86T	RS6-0456-000CN	table 8-7 on page 265
GEAR, 22T/93T	RS6-0452-000CN	table 8-7 on page 265
GEAR, 23T/46T	RS6-0453-000CN	table 8-1 on page 255
GEAR, 23T/46T	RS6-0453-000CN	table 8-7 on page 265
GEAR, 25T/41T	RS6-0449-000CN	table 8-7 on page 265
GEAR, 26T	RB2-3040-000CN	table 8-4 on page 260
GEAR, 26T	RS6-0451-000CN	table 8-7 on page 265
GEAR, 26T	RS6-0458-000CN	table 8-6 on page 264
GEAR, 27T	RS6-0495-000CN	table 8-8 on page 268
GEAR, 31T	RS6-0450-000CN	table 8-7 on page 265
GEAR, 39T	RS6-0499-000CN	table 8-8 on page 268
GEAR, 39T/34T	RS6-0497-000CN	table 8-8 on page 268
GEAR, 45T	RS6-0498-000CN	table 8-8 on page 268
GEAR, 48T	RS6-0454-000CN	table 8-7 on page 265
GEAR, 53T	RS6-0457-000CN	table 8-7 on page 265
GEAR, 58T/92T	RS6-0447-000CN	table 8-7 on page 265
GEAR, 67T	RS6-0455-000CN	table 8-7 on page 265
GEAR, 17T	RS6-0459-000CN	table 8-1 on page 255
GEAR, 26T	RS6-0444-000CN	table 8-4 on page 260
GUIDE, CABLE	RB2-2818-000CN	table 8-1 on page 255
GUIDE, CARTRIDGE, LFT	RB2-2831-000CN	table 8-4 on page 260
GUIDE, CARTRIDGE, RT	RB2-2830-000CN	table 8-4 on page 260
GUIDE, DELIVERY, LOWER	RF5-2602-000CN	table 8-1 on page 255
GUIDE, DELIVERY, UPPER	RB2-2976-000CN	table 8-1 on page 255
GUIDE, ENTRANCE	RB2-2974-000CN	table 8-6 on page 264

Table 8-14. Alphabetical Parts List (continued)

Description	Part Number	Table and Page
HINGE, LFT	RB2-3041-000CN	table 8-5 on page 261
HINGE, RT	RB2-3042-000CN	table 8-5 on page 261
HOLDER, CONTACT	RF5-2609-000CN	table 8-6 on page 264
HOLDER, GEAR	RB2-2899-000CN	table 8-10 on page 272
HOLDER, PIN	RB2-2947-000CN	table 8-7 on page 265
HOLDER, ROLLER	RB2-3047-000CN	table 8-5 on page 261
HOLDER, ROLLER	RB2-3485-000CN	table 8-11 on page 274
HOLDER, SEPARATION PAD	RB2-2838-000CN	table 8-5 on page 261
HOLDER, SEPARATION PAD	RB2-3013-000CN	table 8-9 on page 270
IC, TLP1242	WG8-5382-000CN	table 8-3 on page 257
IC, TLP1242	WG8-5382-000CN	table 8-12 on page 276
INTERLOCK SWITCH CABLE	RG5-4256-000CN	table 8-3 on page 257
INTERMEDIATE PCB ASSY	RG5-4250-000CN	table 8-3 on page 257
IR WINDOW`	RB2-2866-000CN	table 8-1 on page 255
LASER-SCANNER ASSY	RG5-4172-000CN	table 8-3 on page 257
LEFT COVER ASSY	RG5-4139-000CN	table 8-1 on page 255
LEVER, COUPLING	RB2-2940-000CN	table 8-7 on page 265
LEVER, DRIVE RELEASE	RB2-2939-000CN	table 8-7 on page 265
LEVER, PAPER SENSOR	RB2-2894-000CN	table 8-10 on page 272
LEVER, SENSOR	RB2-2836-000CN	table 8-3 on page 257
LEVER, SENSOR	RB2-2981-000CN	table 8-6 on page 264
LEVER, SENSOR	RB2-3474-000CN	table 8-12 on page 276
LFT SIDE PLATE ASSY	RG5-4159-000CN	table 8-9 on page 270
LIGHT PIPE ASSY	RG5-4152-000CN	table 8-1 on page 255
LOWER FEED ROLLER ASSY	RG5-4394-000CN	table 8-11 on page 274
MAIN MOTOR ASSY	RH7-1380-000CN	table 8-3 on page 257
MICROSWITCH	RH7-6051-000CN	table 8-3 on page 257
MP COVER ASSY	RG5-4121-000CN	table 8-1 on page 255
MP PICK-UP ASSY	RG5-4128-000CN	table 8-4 on page 260
MP SENSOR CABLE	RG5-4254-000CN	table 8-3 on page 257
MP TRAY ASSY	RG5-4126-000CN	table 8-1 on page 255
NEED A NAME FOR THIS SWITCH	WT2-5300-000CN	table 8-8 on page 268
PAD, SEPARATION	RB2-2835-000CN	table 8-5 on page 261
PAD, SEPARATION	RB2-3008-000CN	table 8-9 on page 270
PAPER CASSETTE ASSY	RG5-4138-000CN	table 8-9 on page 270
PAPER FEED DRIVE ASSY	RG5-4391-000CN	table 8-8 on page 268
PAPER FEED DRIVE PCB ASSY	RG5-4277-000CN	table 8-12 on page 276
PAPER FEEDER CABLE	RG5-4262-000CN	table 8-3 on page 257

Table 8-14. Alphabetical Parts List (continued)

Description	Part Number	Table and Page
PAPER PICK-UP ASSY	RG5-4127-000CN	table 8-10 on page 272
PIN	RB2-2943-000CN	table 8-7 on page 265
PIN, DOWEL	XD9-0159-000CN	table 8-4 on page 260
PIPE	RB2-2867-000CN	table 8-1 on page 255
PLATE	RB2-3481-000CN	table 8-8 on page 268
PLATE, END	RB2-3003-000CN	table 8-9 on page 270
PLATE, GROUNDING	RB2-2990-000CN	table 8-6 on page 264
PLATE, GROUNDING	RB2-3051-000CN	table 8-1 on page 255
PLATE, GROUNDING	RB2-3080-000CN	table 8-5 on page 261
PLATE, GUIDE. FFC	RB2-2946-000CN	table 8-3 on page 257
PLATE, MOTOR	RB2-2937-000CN	table 8-7 on page 265
PLATE, MOUNT	RB2-2945-000CN	table 8-7 on page 265
PLATE, PRESSURE	RB2-2975-000CN	table 8-6 on page 264
PLATE, SPRING	RB2-2948-000CN	table 8-7 on page 265
PLATE, UPPER LIFTING	RF5-2599-000CN	table 8-9 on page 270
PLATE, GROUNDING	RB2-2812-000CN	table 8-1 on page 255
PRINTER DRIVE ASSY	RG5-4131-000CN	table 8-7 on page 265
RAIL, GUIDE	RB2-2944-000CN	table 8-7 on page 265
REGISTRATION ASSY	RG5-4129-000CN	table 8-4 on page 260
RELAY CABLE	RG5-4280-000CN	table 8-12 on page 276
RETAINING CLIP	XD9-0136-000CN	table 8-8 on page 268
RING, E	XD9-0134-000CN	table 8-5 on page 261
RING, E	XD9-0135-000CN	table 8-10 on page 272
ROLLER	RB2-2892-000CN	table 8-10 on page 272
ROLLER	RB2-2898-000CN	table 8-10 on page 272
ROLLER	RB2-2904-000CN	table 8-4 on page 260
ROLLER	RB2-3484-000CN	table 8-11 on page 274
ROLLER	RB2-2892-000CN	table 8-12 on page 276
ROLLER	RB2-3046-000CN	table 8-5 on page 261
ROLLER, DELIVERY	RB2-2977-000CN	table 8-6 on page 264
ROLLER, DELIVERY	RF5-2603-000CN	table 8-6 on page 264
ROLLER, FACE-DOWN LWR	RB2-2849-000CN	table 8-4 on page 260
ROLLER, FACE-DOWN, UPPR	RF5-2604-000CN	table 8-4 on page 260
ROLLER, FEED	RB2-3490-000CN	table 8-12 on page 276
ROLLER, PICK-UP	RB2-2891-000CN	table 8-10 on page 272
ROLLER, PICK-UP	RB2-2891-000CN	table 8-12 on page 276
ROLLER, PICK-UP	RB2-2900-000CN	table 8-4 on page 260
ROLLER, PRESSURE	RF5-2601-000CN	table 8-6 on page 264

Table 8-14. Alphabetical Parts List (continued)

Description	Part Number	Table and Page
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